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The Book of Fishes

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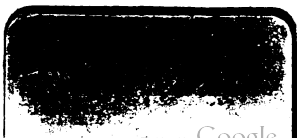
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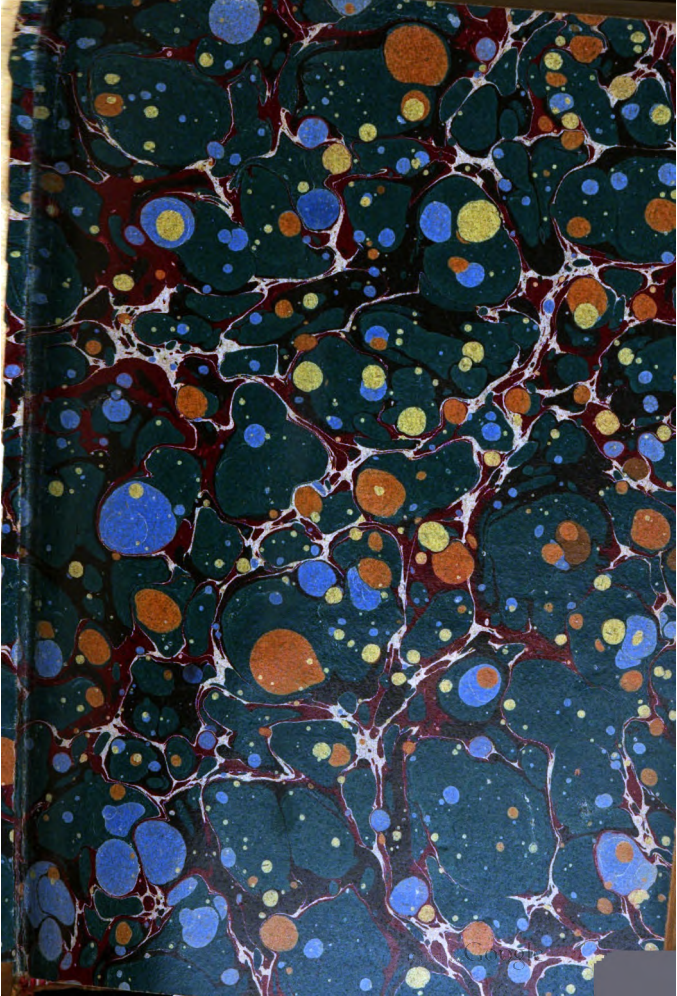
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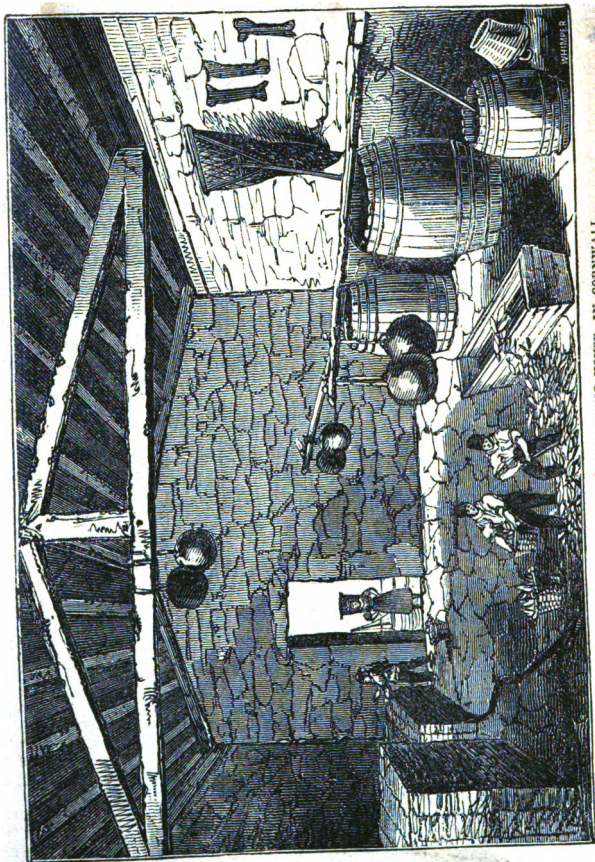
JOHN BARTLETT,

(A. M. 1871.)

Nov. 17, 1892.







INTERIOR OF A FISH-DRYING HOUSE, IN CORNWALL.

②

THE

B O O K

OF

F I S H E S.

(CLASS PISCES.)

PUBLISHED UNDER THE DIRECTION OF
THE COMMITTEE OF GENERAL LITERATURE AND EDUCATION,
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THE BOOK OF FISHES.

THE sounds and seas, each creek and bay,
With fry innumerable swarm, and shoals
Of fish, that with their fins and shining scales
Glide under the green wave, in sculls that oft
Bank the mid-sea ; part single or with mate
Graze the sea-weed their pasture, and thro' groves
Of coral stray ; or sparkling with quick glance
Show to the sun their way'd coats dropt with gold.

MILTON.

INTRODUCTORY CHAPTER.

THE waters which cover the surface of the earth are filled with innumerable living creatures, whose instincts are as different as their forms and colours are beautiful ; among these various tribes the fishes are by far the most valuable. They are found in every ocean, sea, lake, or river ; under the dreary skies of the poles, and the burning latitudes of the tropics. In every part of the globe they furnish an abundant supply of wholesome and nutritious food, which possesses the advantage of being offered to the hand of man at no other cost than the labour of taking, requiring no hired pasture, no shepherd to tend them, and at those seasons of the year when they are in the finest condition, approaching the

shores, and placing themselves within reach of the fisherman.

The intrinsic value of fishes is well illustrated in the saying of Dr. Franklin, that "he who takes a fish out of the water finds a piece of money." In addition to their value as an article of food, they afford us a supply of oil for many useful purposes; from some species that valuable article of commerce, isinglass, is made; the skins of many are employed in the arts; and, among people in the lowest grade of civilization, their bones are formed into hooks, for the purpose of taking others of their kind.

In no other part of the creation are the young produced in such immense numbers. The hard roe of a fish is composed, as we all know, of a great number of small round substances like little seeds; each of these grains is an *ovum* or egg, and produces one young fish. In the cod the number is so great that from four to six millions have been found in one individual. These eggs are deposited in shallow waters on sand-banks and elsewhere, so that they may receive the influence of the heat and light of the sun. The young of a single herring, if suffered to multiply unmolested and undiminished for twenty years, would occupy more space than a substance equal in bulk to ten such globes as that on which we live.

To counteract the effects of such an overwhelming power of reproduction, a war of extermination is constantly being carried on among all the inhabitants of the deep, the larger feeding upon the smaller, and each endowed with a voracious and almost insatiable appetite, so that it may be fairly presumed that not one fish in a million attains maturity out of the enormous numbers pro-

duced. Yet fishes seem to have the power of existing under certain circumstances, without any other nourishment than the water in which they swim, as we may notice in the gold and silver fish when confined in glass vessels.

When the different species of fish are about to deposit their spawn they appear in immense shoals, covering the sea, in close order, for miles in extent, and many feet in depth. At these times they not only furnish our tables with a wholesome food, but afford employment for a great number of men, women, and children. These sources of national wealth became an object of serious attention, in the earliest ages, of almost all maritime nations, and many salutary laws have been passed for the protection of the fisheries.

The form and flexible nature of the body of a fish allow it to move in every direction with great ease and rapidity; and it is not by any means improbable, that the first constructor of a boat or canoe formed his vessel after this model. In the inside of a fish, and close to the back, we find a membranous bag, generally filled with air. This is called the swim or air-bladder, and several uses have been attributed to it, of one we are tolerably certain, namely, the assistance it gives the fish in keeping its body in the right position in the water, that is, with the back uppermost.

Fishes, like birds, migrate from place to place in search of food, or for the purpose of depositing their ~~roe~~, but the distance from which they come is probably greatly exaggerated; in speaking of the common Herring we shall have more particularly to notice this fact. Fishes, although constantly immersed in water, can no more subsist without air than a quadruped or a bird; for

though they appear, as it were, to breathe water, they would be immediately suffocated in that fluid, if the air had been extracted from it by the air-pump, or by any other means. The gills of a fish are the apparatus by which the animal separates the vital air from the water, and answer the purpose of lungs: the water being taken in at the mouth, after passing over the whole surface of the gills, is thrown off by the gill opening; if this is prevented by tying down the gill-cover, the fish is suffocated, and dies in convulsions in a few minutes.

The different methods of taking fish will be more particularly noticed in the course of the work; the principal means employed are baited hooks, and nets of various kinds. The age of fishes has been a matter of considerable doubt, and indeed much uncertainty hangs over the habits and other parts of the history of this class, the natural consequence of the impossibility of tracing them to their haunts in the depths of the sea. There is, however, every reason to believe that they attain a very great age, and they appear to grow during the whole of their life, so that their size alone affords us some idea of the duration of their existence.

The fins by which fishes direct their course through the water are named after the parts of the body on which they are placed, and as it will be impossible to understand the description of many of the species without being acquainted with these names, it will be as well to enumerate them in the outset.

The DORSAL, or *back fins*, of which there are generally more than one, assist in steadying the body of the animal. The CAUDAL FIN, or *tail*, answers the purpose of a rudder, and directs the course of the fish; but it is also the most powerful organ of rapid motion; and when a

fish darts forward to seize its prey, or to escape from an enemy, the pectoral and ventral-fins, are folded close to the body, and the tail moved violently from side to side, as a man impels a boat by means of a single scull over the stern. The PECTORAL, or *breast fins*, may be said to be the hands, and assist in supporting the head and propelling the body forwards. The VENTRAL, or *belly fins*, act like the oars of a boat; and the ANAL, or *vent fin*, which is placed below, near the tail, is of much the same use in keeping the body steady as the dorsal-fin. The covering of a fish, in almost all cases, consists of numerous scales, and its body is provided with a series of pores, through which a kind of mucilage is poured over its whole surface, for the purpose of protecting it from the action of the water.

The whole class of fishes has been separated, by Baron Cuvier, into two divisions, BONY and CARTILAGINOUS; that is, those which possess a bony skeleton, and those in which the hard parts partake more of the character of cartilage or gristle.

According to the last arrangement of the same author, this class is divided into eight Orders, namely—

FISHES WITH A BONY SKELETON

Spinous-finned Fishes; (Order, ACANTHOPTERYGII,) including those fish in which several of the first rays of the dorsal-fin are *spinous*, that is sharp-pointed and hard like a thorn—or in case there are two dorsal-fins, in which the rays of the first are all spinous.

Soft-finned Abdominal Fishes; (Order, MALACOPTERYGII ABDOMINALES,) without spinous-fins on the

back, and having the ventral-fins behind the pectoral, and not attached to the bone of the shoulder.

Soft-finned Subbrachial Fishes; (Order, MALACOPTERYGII SUBBRACHIATI,) without spinous-fins on the back, and having the ventral-fins under the pectoral, and jointed to the bone of the shoulder.

Soft-finned Footless Fishes; (Order, MALACOPTERYGII APODES,) that is, fishes without spinous-fins on the back, and wanting ventral-fins.

Fishes with Tufted Gills; (Order, LOPHOBRANCHII.)

Fishes with Fixed Jaws; (Order, PLECTOGNATHI.)

FISHES WITH A CARTILAGINOUS SKELETON.

Gristly-finned Fishes with Free Gills; (Order, CHONDROPTERYGII.)

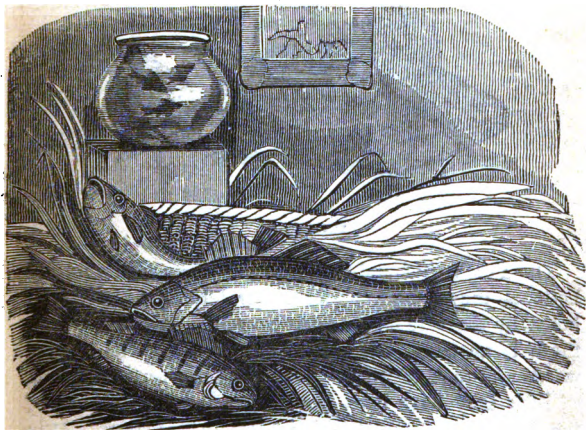
Gristly-finned Fishes with Confined Gills; (Order, CHONDROPTERYGII.)

NOTE.—Fishes are so extremely numerous in species, and many of them at the same time so little known, even to those who possess a tolerable knowledge of the outlines of natural history; and numerous tribes are so strictly confined to the tropical seas, that it would be impossible to render the description of a large proportion intelligible, without the aid of more numerous and more elaborate engravings than the compass of this little work will allow, we have therefore confined ourselves to a description of those fish which are best known, and whose general utility to mankind has rendered them also most interesting.

CLASS PISCES.

OF SPINOUS-FINNED FISHES, (Order, ACANTHOPTERYGII.)

THIS Order contains a great number of species, all agreeing in the principal character of possessing fins with spinous rays, but differing much from each other—they are therefore divided into numerous tribes, the principal of which we shall proceed to notice.



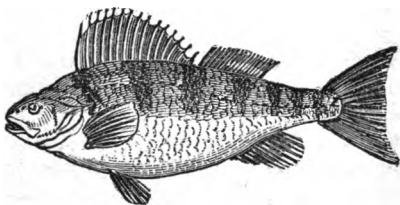
THE PERCH TRIBE.

THE fish belonging to this tribe are generally found in fresh water, and they, all of them, possess hard

scales, sharp at the edges, and their fins have generally a considerable number of spinous rays.

THE COMMON PERCH, (*Perca fluviatilis*.)

THE Perch is one of our most beautiful fresh-water fish, the golden lustre of its sides, the green-brown tint of its back, the beautiful red colour of its ventral and anal fins, all assist to distinguish it in the clear waters which it prefers, particularly when a bright sunshine enlightens it, and produces a greater contrast among the beautiful tints with which it is adorned.



THE PERCH

The Perch are found in clear swift rivers with gravelly bottoms, they seem to prefer moderately deep water, and holes by the side of, or near to gentle streams, where there is an eddy, and hollows under the banks among weeds and roots of trees. These fish are very tenacious of life; they have been known to survive a journey of nearly sixty miles, although packed in wet straw. It is generally believed that a pike will not attack a full grown Perch, being deterred from the attempt by the spinous fins of its back, which this fish always erects at the approach of an enemy. The smaller Perch, however,

are sometimes used as bait for Pike. In one of the pools of Merionethshire there is a singular variety of the Perch, the back of which is hunched, and the lower part of the backbone near the tail strangely distorted. It is an exceedingly voracious fish, and sometimes falls a victim to its appetite, when feeding on the little Stickleback, whose erected spines frequently occasion the death of its more powerful enemy.

In the lake of Geneva, in the winter season, when these fish remain at a very great depth below the surface of the water, a very singular death will frequently overtake those who from any sudden impulse approach the surface. When at a great depth it is enduring the pressure of a much greater body of water than in ordinary cases, and the air contained within the air-bladder is very much compressed, but when the creature mounts towards the surface the pressure becomes less and the air expands. Not being able to find a ready means of escape the air-bladder becomes distended to so great a size, that it is forced out at the mouth of the fish, dragging the stomach, turned inside out, along with it. In this condition the fish floats for a few days on the surface, and then perishes, unless assistance is rendered it by piercing the bladder with a sharp point and allowing the air to escape.

The roe in a Perch is extremely large, weighing as much as seven or eight ounces in a fish of two pounds. When taken in nets it is said to sham death.

THE BASSE, (*Labrax lupus*.)

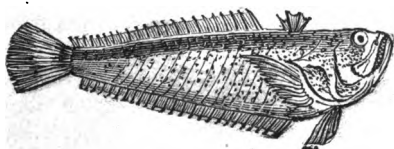
THE Basse differs from the Perch in its gill-coverings, which are provided with scales in the same manner as the rest of its body. It is a salt-water fish, very

abundant on the European coasts, particularly in the Mediterranean, where it is held in great estimation as an article of food: it is not, however, confined to these latitudes, but is met with as far north as Greenland. On the coast of Holland, the fishery of the Basse takes place at stated periods, and is of considerable importance. Its name (*lupus*, the Wolf), was bestowed upon it by the ancients, on account of its great voracity. Worms, shell-fish, and small fry, are its principal food. The Romans, in the time of the Emperor Augustus, considered this fish a great luxury, but its merit was much increased if it was taken in particular places, or at certain times of the year. Sometimes those caught in rivers were preferred; in other cases these were thought nothing of, excepting those of the river Tiber, particularly if taken at Rome itself, between the two bridges; these were very small, and covered with spots; they were, in reality, only the young of the larger fish, although the Romans considered them as a separate species. The usual size of the Basse is about twenty inches, but it has been known to reach three feet.

THE WEAVER (*Trachinus draco*.)

THE common Weaver is a well-known fish in most parts of Europe. In the month of June it approaches the shores for the purpose of depositing its spawn, and is taken at that time in great quantities by means of nets. This fish is considered very delicate food, but many dangerous qualities have been falsely attributed to it, particularly as far as regards the poisonous nature of the spines of its dorsal fin. Cuvier says, "They cannot inject into the wounds they inflict with their spines any poisonous substance, properly so called; but as they are

very strong and sharp pointed, they can, no doubt, pierce the flesh to a considerable depth, which, like all wounds of this kind, may produce dangerous consequences if care is not taken to enlarge them and to allow the blood to flow; this, perhaps, is the most certain, as well as the simplest remedy, and much preferable to all the boasted applications of the ancients."



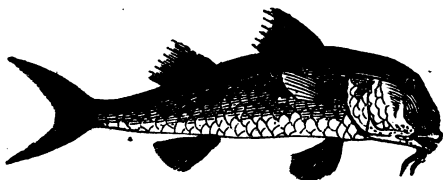
THE WEAVER.

When this fish is taken, the first care of the fisherman is to deprive it of this fin, which is more dangerous than it otherwise would be from the length of time the Weaver lives after it is taken out of the water. This fish instinctively buries itself in the sand, to escape from danger, with only its weapon of defence exposed, and many accidents have happened to bathers and others in consequence.

THE SURMULLET (*Mullus surmuletus*.)

THE Surmullets are the last of the spinous-finned fishes that are included in the group resembling the Perch. In the time of the Romans, during the reign of the Emperors, the extravagant prices that were paid for this beautiful inhabitant of the waters, and the equally extravagant things that were done and said respecting it, were completely ridiculous. An epicure, named Calliodorus, is mentioned by Martial as having given as much

as in English money would amount to 10*l.* 10*s.* 10*d.*, for a Surmullet weighing four pounds. Another glutton is said to have given 243*l.* 10*s.* for three very large ones, which happened to be of an equal size. This happened under Tiberius, and was the cause of that Emperor's imposing taxes upon all provisions when brought to market. These people sent messengers to the most distant parts of the Mediterranean to obtain these fish.



THE SURMULLET.

Another proof of a depraved taste was exhibited by Q. Hortensius, who reared the Surmullets in ponds and brought them alive to table in earthen pans; not that they might be cooked and eaten, but to observe the changes in their brilliant colours in the agonies of death. Cicero says, "Fishes swim beneath the very couches of the guests; in their eyes a Mullet is not fresh unless it dies in the hands of the banquetters; they expose it to view in glass vessels, they observe the different colours, through which a slow and painful agony causes it to pass in succession*."

"Nothing is more beautiful, it is said, than a dying Surmullet; its struggles against death cause the most dazzling red to spread itself over all its body; this is succeeded by a general paleness, but during the pas-

* The fish here noticed is a smaller species than that figured above, namely, the *Mullus barbatus*.

sage from life to death, in how many agreeable shades are not these two colours mingled."

The Surmullet is found on most of the European coasts, if we except the more northerly. In England, its chief place of resort is the southern coast, particularly that of Devonshire, where it appears about the month of May.

THE GURNARD TRIBE.

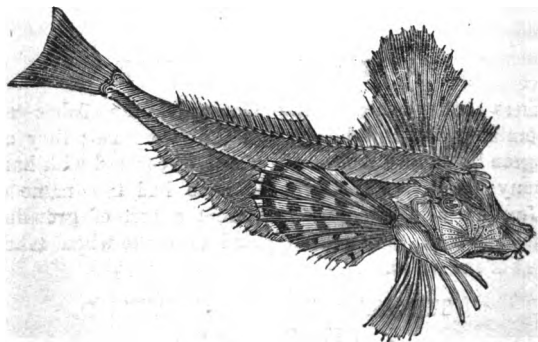
THIS tribe contains the Gurnards, the fishes resembling the Bull-heads, and the Scorpions; they all agree in having their head armed or covered with hard bony plates. The Gurnards have had the name of Growlers also given to them from a sort of growling noise which they are supposed to make when taken out of the water.

THE SAPPHIRINE GURNARD,

(*Trigla hirundo.*)

THIS fish is one of the most beautiful frequenters of the British seas, and singular for the size of its pectoral fins, which would lead one to imagine it capable of supporting its body in the air, like the noted Flying-fish; it is not, however, known to exert this power, or even to possess it. It is the largest of the Gurnard tribe, being nearly two feet in length, and the most brilliant in its colours. These consist of every variety of emerald green, deep blue, gold, and pink. Although the pectoral fins in this fish are very large, there is a species nearly allied to it (the *Trigla volitans*,) found in the Mediterranean, in which these fins are

much larger, and capable of supporting their possessor in the air for a short time. All the Gurnards are extremely voracious fish, feeding on Crabs and various shell-fish, which they seek among the stones and rocks on the sea-coasts, their well-armed head preventing them from receiving injuries while exploring the rocky retreats of their prey. One species, the Gray



THE SAPPHIRINE GURNARD.

Gurnard, much smaller than that we have represented, takes a bait with so much eagerness that it will bite at a piece of red rag tied to the end of a string, and suffer itself to be taken rather than loose its hold.

THE CHÆTODON TRIBE.

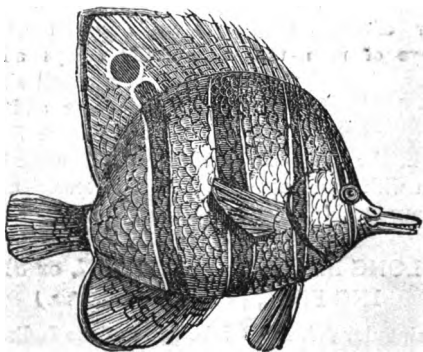
"THE seas of the Torrid Zone," says Cuvier, "have no reason to envy the lands whose coasts they water; the liveliness or the agreeable arrangement of the colours of their productions. If the hot countries of Africa and

America have their Souii-mangas, their Humming-birds, their Cotingas, and their Tanagers, the Indian Ocean and that of the Antilles possess thousands of fish still more dazzling, whose scales reflect the tints of metals and precious stones, contrasted by darker-coloured spots and bands, distributed with a symmetry and regularity equally admirable. The Chaetodons, above all, form a group almost innumerable, which Nature appears to have amused herself with adorning in a manner most proper to please the sight ; rose-colour, purple, azure, velvety black, are spread over the surface of their bodies in rays, stripes, rings, and eye-like spots, on gilded and silvery grounds, or shaded like the most beautiful mother of pearl, with all the colours of the rainbow. The eye of man the more easily enjoys all these beauties, since these fishes are of a small size, and in the habit of keeping near the shore and among rocks where there is but little water ; there frolicking about in the light of the sun, as if to cause it to enlighten with more powerful rays the decorations which they have received from nature."

THE LONG-BEAKED CHÆTODON, OR SHOOT- ING FISH, (*Chaemon rostratus*.)

THIS singular fish is an inhabitant of the Indian seas ; it feeds principally on flies and other small insects that hover about the waters it inhabits. The mode of taking its prey is very remarkable. When it sees a fly at a distance on any of the plants in the shallow water, it approaches very slowly, and with the utmost caution, coming as much as possible immediately under the object ; then placing its body in a slanting direction,

with its mouth and eyes near the surface, it remains for a moment immoveable. Having fixed its eyes directly on the object, it shoots at it a drop of water with its tubular snout, without showing its mouth above the surface, from whence only the drop seems to rise. This is done with so much dexterity, that though at the distance of four, five, or six feet, it seldom fails to bring the fly into the water. With the closest attention the mouth could never be discovered above the surface, although the fish has been seen to eject several drops one after the other, without leaving the place, or in the smallest apparent degree moving its body.



THE LONG-BEAKED CHÆTODON, OR SHOOTING FISH.

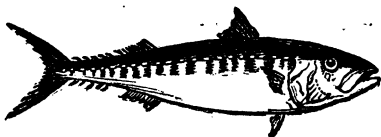
The Chætodons take their name from two Greek words, meaning *hair* and *tooth*, because their teeth are extremely slender and close together, resembling hair or bristles, or rather the *pile* in velvet.

THE MACKEREL TRIBE.

THE fishes which belong to this tribe have been long famed for their agreeable flavour and their immense numbers, and also for the beautiful colours with which they are decorated. The Herring tribe is the only group of this class that approaches the Mackerel in numbers or utility. The scales with which their skin is covered are in general so minute as to cause the body to appear as if it were naked. The most notable character of most of the tribe, is the singular manner in which the second dorsal fin is divided.

THE COMMON MACKEREL, (*Scomber scombrus*.)

THE Common Mackerel visits our shores in vast shoals; but from being very tender and unfit for long carriage, is found less useful than other gregarious fish. In some



THE COMMON MACKEREL.

places, it is taken by lines from boats, as during a fresh gale of wind it readily seizes a bait. It is necessary that the boat should be in motion in order to drag the bait along (a bit of red cloth or a piece of the tail of a Mackerel,) near the surface of the water. The great fishery for Mackerel is on some parts of the west coast of England. This is of such an extent as to employ, in the whole, a capital of nearly 200,000*l*. The fisher-

men go out to the distance of several leagues from the shore, and stretch their nets, which are sometimes several miles in extent, across the tide, during the night. The meshes of these nets are just large enough to admit the heads of tolerably large fish, and catch them by the gills. A single boat has been known to bring in, after one night's fishing, a cargo that has sold for nearly seventy pounds. Besides these, there is another mode of fishing for Mackerel, in the west of England, with a *ground seine*. A roll of rope, of about two hundred fathoms in length, with the net fastened to one end, is tied at the other, to a post or rock, on the shore. The boat is then rowed to the extremity of this coil, when a pole fixed there, leaded heavily at the bottom, is thrown overboard. The rowers from hence make as nearly as possible a semicircle, two men continually and regularly putting the net into the water. When they come to the other end of the net, another leaded pole is thrown overboard. Another coil of rope, similar to the first, is by degrees thrown into the water, as the boatmen make for the shore. The boat's crew now land, and, with the assistance of persons stationed there, haul in each end of the net till they come to the two poles. The boat is then again pushed off towards the centre of the net, in order to prevent the more vigorous fish from leaping over the corks. By these means, three or four hundred fish are often caught at one haul.

A Norwegian author relates the story of a sailor belonging to a ship lying in one of the harbours on the coast of Norway, who went into the water to wash himself, when he was suddenly missed by his companions; in the course of a few minutes, however, he was seen

on the surface with vast numbers of Mackerel fastened on him. The crew went in a boat to his assistance, and though when they got him up, they succeeded with some difficulty in removing the fishes from him, they found it was too late, for the poor fellow shortly afterwards expired.

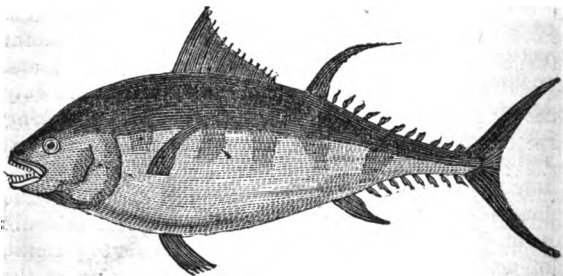
"This fish," says Anderson, "passes the winter in the north; towards the spring it approaches Iceland, Scotland, and Ireland, and enters the Atlantic Ocean, whence one column passing along the coast of Portugal and Spain, enters the Mediterranean, while the other turns into the British Channel, and appears there in May, on the coasts of France and England, and from thence passes in June along those of Holland and Friesland. This second column having reached in July the coasts of Jutland, detaches a division, which making the tour of that Peninsula, enters the Baltic Sea, and the remainder passing along the coast of Norway, returns to the north." In noticing this account of the migrations of the Mackerel, Cuvier appears to doubt the truth of the long voyage which it is said to perform, chiefly from the fact of the fisheries beginning at the same time, or even sooner, in the Mediterranean than in the British Channel. From this it would seem that their winter-retreats are to be sought for much nearer home than is generally supposed.

THE COMMON TUNNY, (*Thynnus vulgaris*.)

THE Tunny is a fish of much greater size than the Mackerel, and is distinguished by having the scales on the chest larger than on any other part of the body, forming the appearance of a kind of breast-plate. The

usual size of this fish is from two to three feet in length; they are at times, however, taken as long as ten feet. Aristotle mentions an old Tunny which weighed upwards of two hundred weight.

The Tunny-fishery was attended to with great care by the ancients, and still employs a vast number of hands in different parts of the Mediterranean, chiefly in Catalonia, Provence, Liguria, Sardinia, and Sicily. These fish enter the Mediterranean in vast shoals, and swim always in a triangular figure, thus $\triangleright A$, with the point A in front.



THE COMMON TUNNY.

The Tunnies are taken in two ways. In the first case, when a sentinel, posted on an elevated spot, has made a signal that the fish are in view, and has pointed out the quarter from which they are coming, a number of boats put to sea under the command of a leader, and arrange themselves in a curve, and joining their nets form an enclosure, which alarms the Tunnies and gradually drives them into closer ranks: they still continue to add fresh nets, continually driving the fish towards the shore. When they have reached water only

a few fathoms in depth, they cast their last and largest net, which has a kind of pocket or long bag attached to it; this they draw towards the land, and with it they bring all the fish. The small ones are then taken out with the hands, and the larger are landed after they are despatched with boat-hooks. This mode of fishing, which is employed on the coast of Languedoc, produces sometimes at a single *take* as much as fifteen ton weight of fish.

The second kind of nets, called by the Italians *tonnaro*, are much more complicated; Brydone calls the whole apparatus a kind of aquatic castle, constructed at great cost,—a double row of large long nets, supported, in an upright position, by means of corks fastened to their upper edge, and by lead weights and stones at the lower, are fixed by anchors in such a manner as to form an enclosure, parallel to the shore for many hundred fathoms, sometimes an Italian mile in length, and divided into many chambers by transverse nets, and open on the land-side by a sort of door. The Tunnies, who always swim close to the shore, pass between it and the line of nets. Arrived at the end of this they meet with a large net stretched across, which closes the passage and obliges them to enter the *tonnaro* by the openings which are practicable; when they have once entered they are driven onward in various ways from chamber to chamber, till they reach the last, which has been named the chamber of death. A horizontal net here forms a kind of platform, which a great number of sailors, who have assembled in their boats, raise up in such a manner as to lift up the fishes at the same time nearly to the surface. It is now the action commences, and blows are dealt in all directions with boat-hooks, and weapons of that de

scription; the spectacle becomes quite imposing, and attracts a great number of spectators, and it forms at the same time one of the principal amusements of the rich Sicilians, and one of the chief branches of the commerce of the island.

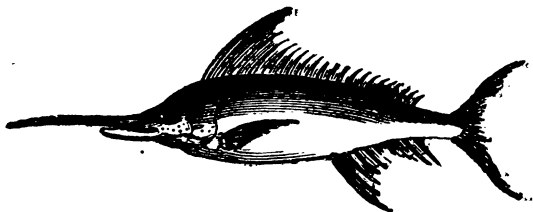
The flesh of the Tunny, when uncooked, bears a close resemblance to beef. "You would scarcely believe," says Cetti, "the different tastes of the various parts of the Tunny; at each part of the body, and at various depths from the surface, it varies; here it is like veal, there pork. The Sardinian fishermen employ a host of words, which the memory can scarcely retain, to distinguish these different morsels. The flesh of the belly, which is the most delicious, is called *sorra*, and costs twice as much as the *netta*, which is flesh of the second quality." Like all the Mackerel tribes, the Tunny remains fresh and good for a few hours only after it is taken; if the least tainted it is not only unwholesome, but even a dangerous kind of food.

THE SWORD-FISH, (*Xiphias gladius*.)

THE name of the Sword-fish has been given to this singular creature from the lengthened form of its upper jaw, the extremity of which is prolonged in such a manner as to resemble a sword. In some parts of France it has acquired the name of the Emperor, because they say it resembles the Roman emperors, who are represented with a sword in the hand. This fish is extremely large and powerful, being from twelve to eighteen feet in length: of its amazing strength the following anecdote is sufficient evidence:—

Van Schouten, in his voyage round the world about the beginning of the seventeenth century, states that,

"a great fish or sea-monster, having a horn like an elephant's tooth, except being full and not hollow, struck the ship with such great strength, that it entered into three planks of the ship, two of green and one of oaken wood; and into a rib, where it turned upward, to their great good fortune."



THE SWORD-FISH.

In the year 1725, in refitting his majesty's ship *Leopard* after her return from the West Indies, the shipwrights found in her bottom part of the sword of one of these fishes. From the direction in which the sword lay, the fish is supposed to have followed the ship when under sail; it had penetrated through the sheathing, which was an inch thick, passed through three inches of plank, and beyond that four inches and a half into the timber. The force requisite to effect this (since the vessel was proceeding in a direction from the fish,) must have been excessive. The workmen declared it impossible, with a hammer of a quarter of a hundred weight, to drive an iron pin, of the same form and size, to the same depth, in less than eight or nine strokes, whilst this had been effected by only one.

The chief resort of the Sword-fish is the Mediterranean

sea, where it is found in great numbers; but although not so plentiful, it is far from an uncommon visiter on the French and Spanish coasts: in the British seas it is seldom met with.

The taking of the Sword-fish is said to be better sport than that of the Tunny. A man in the rigging of the vessel, or on a neighbouring rock, gives notice of its approach; it is then attacked with a small harpoon, attached to a long line. It is, in fact, merely Whale-fishing in miniature. Sometimes the harpooner has to wait for hours together before it comes in sight. The Sicilian fishermen, who are extremely superstitious, chant a certain ditty (supposed to be a Greek sentence), Cuvier, however, says it is an assemblage of words belonging to no language, which they look upon as a charm to attract the Sword-fish to their boat. This is the only bait they use; and they pretend that it is most wonderfully efficacious, and obliges the fish to follow them. On the other hand, if unfortunately it should hear them pronounce a single Italian word, it dives at once, and is never heard of again.

Oppian speaks of a very singular method of taking these fish, by forming a boat so as to resemble the Sword-fish itself for the purpose of deceiving them. There is at present in the British Museum part of the sword of this fish, buried in a piece of wood which once formed part of a vessel; it was broken from the living fish by the violence of the shock, and had penetrated so deeply, that but for this lucky accident the ship would to a certainty have sunk.

To account for this attack on these inanimate masses, it is to be remembered that the Sword-fishes, naturally

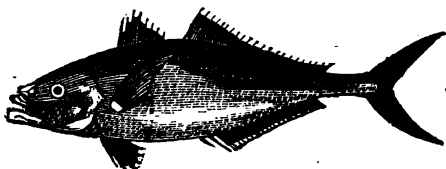
waging war with Whales and the larger kinds of *Cetacea*, may very likely mistake the hull of the vessel for the enormous body of one of these huge creatures.

THE PILOT-FISH, (*Naucrates ductor*.)

THE Pilot-fish has received its name from its habit of following vessels, and from the commonly received, though false notion, of its conducting the great white Shark to its prey. The ancients believed that it pointed out the course to mariners, who, when at sea, had lost their reckoning, and continued to accompany them until they approached the land. The fact appears to be, that the Shark and the Pilot-fish both follow the vessel to avail themselves of any food that may fall overboard, the Pilot-fish in the mean time always keeping in the rear of the Shark, where from its greater activity it is always sure of escaping from its terrible enemy, in case the Shark should deign to notice its humble companion. One of these little fish is said to have followed a vessel with great perseverance for the distance of fifteen hundred miles.

THE SCAD, OR HORSE-MACKEREL, (*Caranx trachurus*.)

THE Scad is not frequently taken on our coasts, but is

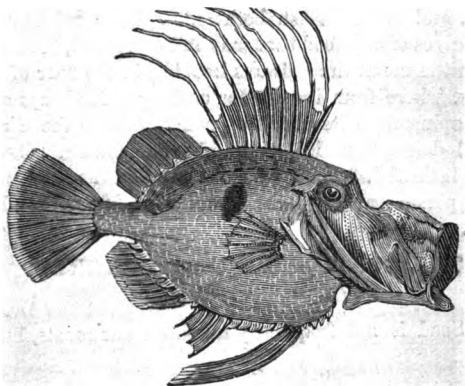


THE SCAD, OR HORSE-MACKEREL.

common in most of our European seas. It differs from the Mackerel in having its lateral line armed to a greater or less extent, with large sharply-pointed scales or plates: it resembles the Mackerel in flavour, though it does not quite equal it.

THE JOHN DORY, (*Zeus faber*.)

THE singular name of this fish, John Dory, has been derived from various sources; by some it is said to have originated in the French words, *Jean Doré*, Golden



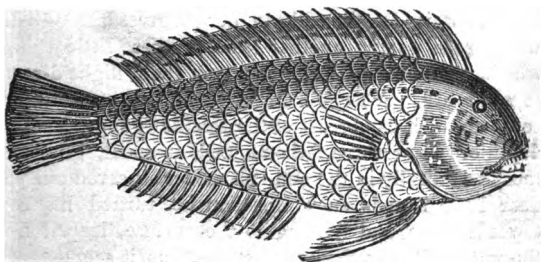
THE JOHN DORY.

John, in allusion to its colour; others again derive it from the French, *Jean Adoré*, Worshipful John, because it has been assumed to be the fish from whose mouth the tribute-money was taken, and the spots on the sides were supposed to be the marks of St. Peter's finger.

This odd-shaped fish is taken in considerable numbers on the southern coast of England: it is at present considered an excellent article of food, but a few years ago was but little sought after.

THE DORADO, (*Coryphæna hippuris.*)

THIS magnificent fish is found in almost all the seas of hot climates: it is common in the Mediterranean, where it is esteemed as an excellent article of food. It is the



THE DORADO.

noted Dolphin of the sailors, and the constant persecutor of the Flying-fish. Being so commonly called a Dolphin, it may be as well to undeceive our young readers, who may not be aware of the fact, that the true Dolphin, although an inhabitant of the waters, is a warm-blooded animal, and not a fish; see the WHALE TRIBE in the *Book of Animals*.

The Dorado is extremely voracious, and is easily taken by means of an artificial Flying-fish, made in the

most clumsy manner with a piece of wood and a few white feathers.

Captain Basil Hall gives the following spirited description of this fish; to prevent confusion we have called it by the name of the Dorado instead of Dolphin, the term employed by him. "Shortly after, observing the cluster of Flying-fish rise out of the water, we discovered two or three Dorados ranging past the ship in all their beauty, and watched with some anxiety to see one of those aquatic chases, of which our friends, the Indiamen, had been telling us such wonderful stories. We had not long to wait, for the ship in her progress through the water soon put up another shoal of these little things, which, as the others had done, took their flight directly to windward. A large Dorado, which had been keeping company with us abreast of the weather-gangway, at the depth of two or three fathoms, and, as usual, glistening most beautifully in the sun, no sooner observed our poor dear little friends on wing, than he turned his head towards them, and darting to the surface, leaped from the water with a velocity little short, as it seemed, of a cannon-ball.

"The length of the Dorado's first spring could not be less than ten yards, and after he fell we could see him gliding like lightning through the water for a moment, when he again rose, and shot forwards with considerably greater velocity than at first, and, of course, to a still greater distance. In this manner the merciless pursuer seemed to stride along the sea with fearful rapidity, while his brilliant coat sparkled and flashed in the sun quite splendidly. As he fell headlong on the water at the end of each huge leap, a series of circles were sent far

over the still surface, which lay as smooth as a mirror, for the breeze, although enough to set the royals and top-gallant studding-sails asleep, was hardly as yet felt below.

“The group of wretched Flying-fish, thus hotly pursued, at length dropped into the sea; but we were rejoiced to observe that they merely touched the top of the swell, and scarcely sunk in it, at least they instantly set off again in a fresh and even more vigorous flight.

“The greedy Dorado, however, was fully as quick-sighted as the Flying-fish, who by changing their course were endeavouring to elude him, for whenever they varied their flight in the smallest degree, he lost not the tenth part of a second in shaping a new course, so as to cut off the chase, while they, in a manner really not unlike that of the hare, doubled more than once on their pursuer. But it was soon too plainly to be seen, that the strength and confidence of the Flying-fish were fast ebbing. At length the unfortunate little creatures, one after another, either popped right into the Dorado’s jaws as they lighted on the water, or were snapped up instantly afterwards.” The changes of colours which take place while this fish is dying are extremely beautiful, and have been often noticed. Falconer, in his poem of the *Shipwreck*, says ·

“ And now approaching near the lofty stern,
A shoal of sportive dolphins they discern,
From burnished scales they beam refulgent rays,
Till all the glowing ocean seems to blaze.
Soon to the sport of death the crew repair,
Dart the long lance, or spread the baited snare;
One, in redoubling mazes, wheels along,
And glides unhappy near the triple prong.
Rodmond unerring o’er his head suspends
The barbed steel, and every turn attends

Unerring aimed, the missile weapon flew,
And plunging struck the fated victim through.
Th' upturning points his ponderous bulk sustain,
On deck he struggles with convulsive pain ;
But while his heart the fatal javelin thrills,
And flitting life escapes in sanguine rills,
What radiant changes strike th' astonished sight !
What glowing hues of mingled shade and light ?
Not equal beauties gild the lucid west,
With parting beams all o'er profusely drest.
Not lovelier colours paint the vernal dawn,
When orient dew's impearl th' enamell'd lawn ;
Than from his sides in bright suffusion flow,
That now with gold empyreal seem to glow ;
Now in pellucid sapphires meet the view,
And emulate the soft celestial hue :
Now beam a flaming crimson on the eye,
And now assume the purple's deeper dye :
But here description clouds each shining ray,
What terms of art can Nature's power display ?

THE RIBAND FISH TRIBE.

THE fishes belonging to this tribe take their name from their long flattened form ; they are never sought after as an article of food, and are mostly found in the seas of hot climates.

THE RIBAND FISH, (*Cepola rubescens*.)

THIS species is a native of the Mediterranean, and attains the length of three or four feet ; its colour is extremely beautiful, being a lively red ; and the rapid and curious mode in which it swims render it a most interesting object, as it moves about in the shallow

waters, in which it seeks its prey; this consists of different kinds of shell-fish. The greatest part of its length



THE RIBBAND FISH.

is occupied by what may more properly be called its tail than its body, this is extremely thin and almost transparent, and waves about in beautiful undulations as the fish sport through the waters.

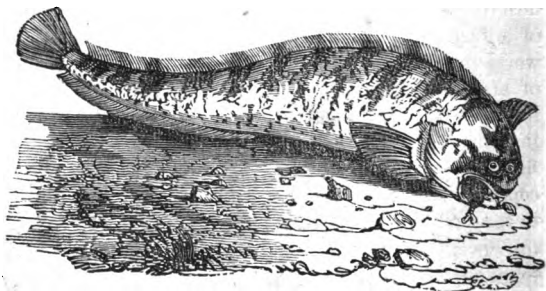
THE GUDGEON TRIBES.

THESE fishes are mostly of a lengthened form, and have the skin covered like the Eels with a kind of slime; among them we may count, the Blennys, the Gudgeons, the Sea-Wolf, and many others.

THE SEA-WOLF, OR CAT-FISH, (*Anarhichas lupus.*)

THE Cat-fish is found in all the northern seas of Europe; it grows to the length of four or five feet, and is an extremely powerful creature; it lives entirely on shell-fish, and to enable it to crush the hard shells of its prey its mouth is most curiously furnished with a formidable

arrangement of teeth, those in the front being sharp-pointed and conical, like the dog-teeth in beasts of prey, while those with which both the jaws are provided, and which cover the whole surface of the tongue and the



THE SEA-WOLF

roof of the mouth, resemble strong rounded bony prominences. The first description of teeth enable it to seize its prey and prevent its escape, while the second effectually crush it and deprive it of life, acting like an immense pair of nut-crackers. Its flesh resembles that of the Eels. The Icelanders take these fish in large numbers, and dry and salt them for food; the skin forms a kind of shagreen, and they use the gall instead of soap.

THE FISHING-FROG TRIBE.

THE FISHING-FROG, (*Lophius piscatorius*.)

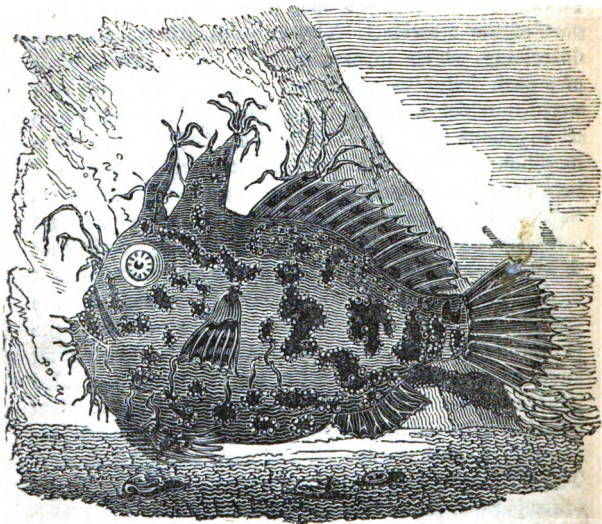
If we select what appear to us the most unlikely subjects in the creation, and examine carefully into their

properties and uses, we cannot fail being struck with the surprising care bestowed by the Creator on the meanest of his creatures, (if we may apply that term to any part of the creation.) The uncouth fish we are now describing, which appears like a large unformed mass of a dark jelly-like substance, would be the last in the world in which we should be led to expect the existence of any acute instinct. But we shall find that the mode in which it attracts its prey is extremely singular and ingenious. Its clumsy figure, and the small size of its fins, render it incapable of any rapid movements, and consequently of the power of following its active victims; to compensate this want of activity, its instinct teaches it to conceal itself in the mud, leaving exposed only the extremities of the fleshy filaments which grow from the summit of the head; these are of a red colour resembling small worms, and being kept in motion by the concealed angler, induce the small fish to draw near, who, when about to seize on their expected food, are suddenly entrapped in the immense jaws of their concealed enemy. The Fishing-frog is found on the coasts of Cornwall, and other parts of the southern shores of Europe.

THE PAINTED HORN-FISH, (*Antennarius picta*, Commerson.)

THIS fish resembles the Fishing-frog in its mode of taking its prey, but differs materially from it in many other respects, particularly in having the power of inflating its body to a great extent, so as to float with ease on the surface of the water: there are several species of the Horn-fish, which are all natives of hot climates. The whole of this tribe are furnished with thick and fleshy

pectoral fins, acting like feet, and sufficiently powerful to enable them to crawl on the ground with considerable



THE PAINTED HORN-FISH.

ease. The whole of the body is covered with small fleshy filaments, resembling those with which the head is furnished, but not so large.

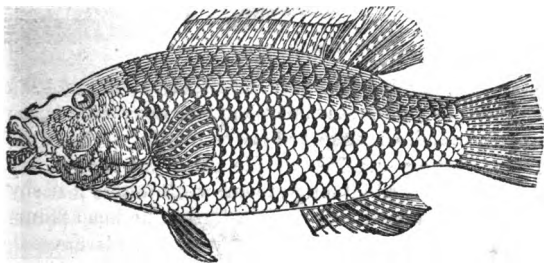
These fish can exist for several days out of the water; they possess this faculty in common with several other genera, in which the opening to the gills is extremely small, preventing these organs of breathing from becoming dry, by protecting them from the air.

THE WRASSE TRIBE.

THERE are many species of these beautiful fish, both in the European seas and in those of the tropical regions; they are all distinguished by their extremely brilliant colours. The chief places to which they resort are holes in rocks on the coast, particularly the small bays which are formed by the inroads of the sea; here they find an abundance of food in the various kinds of shell-fish which have taken refuge in these spots.

THE ANCIENT WRASSE, OR OLD WIFE, (*Labrus maculatus*,)

Is a species belonging to this tribe, frequenting the southern coasts of England; it is a most beautiful creature, the body being variegated with gold, scarlet, and



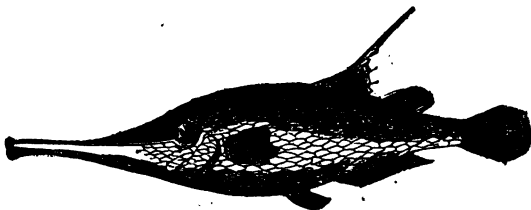
THE WRASSE.

bright blue. This genus takes its name of *Labrus* from the Latin word *labrum*, a lip; one of its distinguishing characters being the thick fleshy lips with which the mouth is furnished.

THE SEA-SNIPE TRIBE.

THE SEA-SNIPE, (*Centriscus scolopax*.)

THE Sea-snipe is an inhabitant of the Mediterranean sea*; it is an extremely curious fish as far as regards the singular form of its mouth, which is extremely small, and placed at the extremity of its long and bony head, and if we had but access to its secret haunts, we should no



THE SEA-SNIPE.

doubt discover that this peculiar formation of the head was given to it for some benevolent purpose; as it is, we can only admire it as one of the wonderful works of the Creator, resting satisfied that He never yet formed any thing in vain; and although to our weak minds many of his ways are inscrutable, yet the lessons he has allowed us to learn all teach us that every part of his creation combines the utmost simplicity and the strictest economy, with the highest beauty of execution, and the most unsparing liberality.

* Although not commonly met with in the English seas, it has been taken in two or three instances on the Cornish coast.

**OF SOFT-FINNED FISHES,
WITH THE VENTRAL FINS BEHIND THE PECTORAL.
(Order MALACOPTERYGII ABDOMINALES.)**

THIS order contains an immense number of useful and interesting species, which all agree with each other in the position of the ventral fins ; among those which frequent the fresh water are found, the Carp, Barbel, Gudgeon, Tench, Bream, Loche, &c. : in one group are placed the Pike, the Gar-fish, and that curious creature the Flying-fish. The Salmon, Trout, &c. belong to another family ; while the Herring, Pilchard, Anchovy, &c. are arranged by themselves.

THE CARP TRIBE.

THE fish resembling the common Carp have a mouth but slightly opening ; their jaws are feeble, and generally toothless, but to make up for this deficiency the throat is closely covered with teeth. Of all fish they are the least inclined to animal food, living chiefly on seeds and herbs, and even on mud and slime ; they have but one dorsal fin, and all inhabit fresh waters.

THE COMMON CARP, (*Cyprinus Carpio.*)

THE Carp is a very well known fish, and found in most parts of the world ; it appears, however, not to have been originally an English animal, but to have been brought here from the continent, and this might the more easily be done on account of the length of time it lives when taken out of the water ; it is easily reared, and thrives well in ponds, or any enclosed piece of water. It is a favourite fish with our anglers, and sought after, per-

haps, more than any other, if we except the trout. Izaak Walton says, 'The Carp is the queen of rivers': a stately, a good, and a very subtle fish.' As a proof of the former scarcity of this fish, we may quote an ancient author, Dame Julian Berners, prioress of the nunnery of Sopwell, near St. Alban's, a noted angler; she says, 'The Carp is a deyntous fysshe, but there ben but few in Englonde, and therefore I write the lasse of hym. He is an euyll fysshe to take; for he is so stronge enarmyd in the mouthe, that there may no weke harnays hold hym.'

The Carp lives to a great age, and attains a large size. In August, 1799, the Earl of Essex fished a large pond near Radnor forest, which had been stocked fifty-eight years. Carp and Eels were the only fish found in it; of the former, one hundred brace were taken, that weighed from fourteen to fifteen pounds each Carp; of the latter, the largest exceeded eight pounds.

This, however, is nothing to what is reported by Walton: "The Carp, if he have water-room and good feed, will grow to a very great bigness and length: I have heard to be much above a yard long. 'Tis said by Jovius, who hath writ of fishes, that in the lake Lurian, in Italy, Carp have thriven to be more than fifty pounds weight."

The tongue of the Carp is very slender, but a piece of flesh-like substance in the roof of the mouth has been falsely called a tongue; Walton, believing this to be the tongue, says, quaintly enough, "The tongues of Carps are noted to be choice and costly meat, especially to those that buy them."—In giving his directions for fishing for Carp, the same author says, "And my first direction is, that if you will fish for a Carp you must put on a very large measure of patience, especially to fish for a river Carp:

I have known a very good fisher angle diligently four or six hours in a day, for three or four days together for a river Carp, and not have a bite: and you are to note, that in some ponds it is as hard to catch a Carp as in a river, that is to say, where they have store of feed, and the water is of a clayish colour."

Dr. Smith, speaking of the Prince of Condé's seat at Chantilly, says, "The most pleasing things about it were immense shoals of very large Carp, silvered over with age like Silver-fish, and perfectly tame; so that when any passengers approached their watery habitation, they used to come to the shore in such numbers as to heave each other out of the water, begging for bread, of which a quantity was always kept at hand on purpose to feed them. They would even allow themselves to be handled."

THE GOLD AND SILVER FISH, (*Cyprinus auratus*.)

THIS beautiful species of Carp must be well known to all our young readers, but many perhaps will suppose that the Gold and Silver Fish are two different kinds; this however is not the case, the difference being only an accidental variation, as the young of those which are of a golden colour will sometimes be silver fish, and of those which are of a silver hue golden.

These pretty creatures strongly illustrate the effects of domestication on the animal creation, in altering not only the colour, but even the form of individuals; many of these little prisoners become curiously distorted, some being entirely without a caudal-fin, in others this fin is very large, and divided into three or four lobes, while some have a kind of double tail, and others have the eyes

enormously large and prominent. These fish were originally brought from China about the year 1691.—Although they exist for a long time without food, or at least upon the small degree of nourishment which they can obtain from the water, it is not to be supposed they would willingly submit to this state of abstinence; on the contrary, they will greedily devour bread, and many other substances, when offered to them. In Britain they seldom exceed seven inches in length; but lately, in dragging a pond belonging to Mr. W. B. Page, of Southampton, many were found larger than a full-grown herring.

THE TENCH, (*Cyprinus tinca.*)

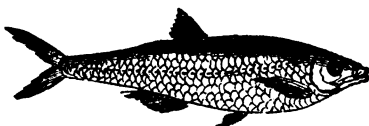
MANY ridiculous stories have been told of the properties of the Tench; he has been called the physician of fishes, and it is said that the Pike, being either sick or hurt, is cured by the touch of the Tench, and that the Pike in return will not be a wolf to his own physician, but forbears to devour him be he ever so hungry. Walton, believing these fanciful tales, says, "In every Tench's head there are two little stones, which foreign physicians make great use of; but he is not commended for wholesome meat, though there be very much use made of them for outward application." The two little stones are the bones of the ear, and are to be found not only in the head of the Tench, but in that of every other fish. The Tench is extremely partial to deep ponds with muddy bottoms; here it frequently conceals itself, and perhaps we may attribute its freedom from the attacks of the voracious Pike to this cause rather than any other. It sometimes attains a very great size.

A piece of water at Thornville Royal, Yorkshire, which had been ordered to be filled up, and into which wood, rub-

bish, &c., had been thrown for years, was in November, 1801, directed to be cleared out. Being so choked up with weeds and mud, and so little water remaining, no one expected to see any fish, unless it might be a few Eels, yet nearly two hundred brace of Tench of all sizes, and as many Perch, were found. After the pond was thought to be quite cleared, under some roots there appeared to be an animal, which was conjectured to be an Otter; the place was surrounded, and on opening an entrance among the roots, a Tench was found, of most singular form, having literally assumed the shape of the hole in which it had, of course, been confined for many years; his length was nearly three feet, his circumference two feet three inches, and his weight eleven pounds nine ounces and a quarter; his colour was also singular, his belly being vermilion, like that of a Charr. This extraordinary fish, after having been inspected by many persons, was put into the water, but either from confinement, age, or bulk, it at first merely floated, and at last with difficulty swam away.

: THE BLEAK, (*Cyprinus alburnus*.)

THIS little fish is extremely common in the lakes and rivers of Europe; it seldom exceeds six inches in length,



THE BLEAK.

and as an article of food is scarcely sought after; our ingenious neighbours, the French, have however turned it to good account in the manufacture of artificial pearls.

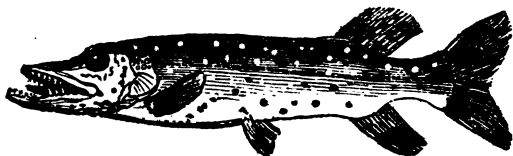
These are formed with the pearly substance which is found at the roots of the scales, and in other parts of the fish, and is known, when prepared, by the name of *Essence of Pearl*. To obtain this essence of pearl it is only necessary to scrape off the scales of the Bleak with a blunt knife, over a bucket of very clean water. After the scales have settled, the first water is thrown away, as it is generally discoloured by the blood and other impurities from the body of the fish. The scales are then washed with an abundance of water, in an extremely fine sieve over the same bucket, and the essence of pearl passes through by itself, and falls to the bottom; they are washed a second, and even a third time, to remove all the essence. The sediment appears like a muddy mass, of a bluish-white colour and very brilliant, exactly resembling the finest native pearls, or the purest mother-of-pearl. The substance thus obtained is very easily decomposed, and becomes rapidly putrid, especially in warm weather. To preserve it, it is kept in phials, in ammonia (spirits of hartshorn.)

To make the artificial pearls, small hollow glass beads are blown, and a quantity of the pearl-essence is mixed with very pure isinglass dissolved in water; a drop of this liquid pearl is then introduced into the glass bead, and spread over its inner surface by moving it about in various directions. It is then dried as quickly as possible, and the bead is filled either wholly or in part with melted bees' wax. These fish always prefer those parts of the stream where the current is strongest and the waters most agitated; if the water they frequent has no rapid current, the fishers endeavour to produce one by throwing large masses of stone and other substances into the mud.

THE PIKE TRIBE.

THE PIKE, (*Esox lucius*.)

OF all the fishes that inhabit the fresh water, the Pike is by far the most voracious. Its extreme ferocity has attained for it the name of the Tyrant of the rivers, and the Fresh-water Wolf. In fish-ponds it proves itself a most destructive creature.



THE PIKE.

A Pike was placed in a canal, in the garden of Lord Cholmondeley, which at that time contained a great quantity of fish: the Pike was an ell in length, and weighed thirty-five pounds. Twelve months afterwards the water was drawn off, and it was discovered that it had devoured all the fish, except a large Carp that weighed between nine and ten pounds, and even this had been bitten in several places. The Pike was again put in, and an entire fresh stock of fish for him to feed on: all these he devoured in less than a year. Several times he was observed, by workmen who were standing near, to draw Ducks and other water-fowl under water. Crows were shot and thrown in, which he took in presence of the men. From this time, the slaughtermen had orders to feed him with the garbage of the slaughter-house; but being afterwards neglected, he died, it is supposed, for want of food.

Instances of the greedy nature of the Pike might be multiplied without end. Walton says, "I have been assured by my friend, Mr. Seagrave, that keeps tame Otters, that he has known a Pike, in extreme hunger, fight with one of his Otters for a Carp that the Otter had caught, and was then bringing out of the water."

A man going to a pond, where it seems a Pike had devoured all the fish, to water his mule, the Pike seized his mule by the lip; to which it hung so fast, that the mule drew him out of the water, and by that accident the owner of the mule angled out the Pike.

THE GAR FISH, (*Esox belone*.)

THE Gar-fish or Sea-pike is common in most of the European seas, it seldom exceeds eighteen inches in length on the English coasts; but Sir William Hamilton says, that a fish of this kind was taken at Naples that weighed fifteen pounds, yet even there it was considered an extraor-

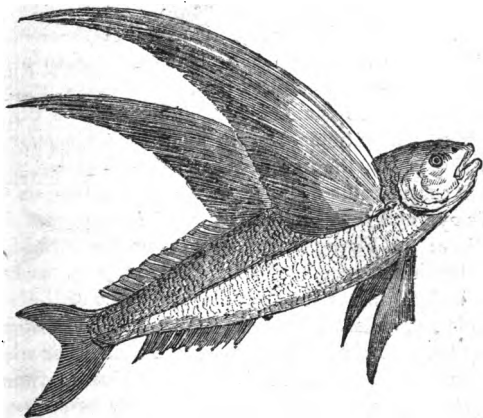


THE GAR FISH.

inary occurrence, and on that account it was presented to the King. It generally appears here a short time before the arrival of the Mackerel. Its flesh has much the flavour of that fish, but is not held in so much esteem as it deserves, probably from the peculiar colour of its back-bone, which is naturally of a bright grass green. In its native element it is noted for the grace and rapidity of its movements, *serpentine* as it were in every direction, and darting forward at times with the rapidity of lightning.

THE FLYING-FISH TRIBE.**THE FLYING-FISH, (*Exocetus volitans*.)**

THERE are two well-known species of this interesting creature; that figured below, which inhabits the main ocean between the tropics, and the *Exocetus exiliens* found in the Mediterranean. These fish are easily known by the extreme size of the pectoral-fins, which are sufficiently large to sustain them for a short time in the air. Both the head and the body are covered with

**THE FLYING-FISH.**

scales, and their eyes are very large and prominent, and allow them to be aware of the approach of danger from any quarter. We cannot better describe the appearance and habits of this beautiful creature, than by quoting the words of Captain Basil Hall. It is to be understood

that the ship in which he sailed was just entering the tropics.

"While we were thus stealing along pleasantly enough under the genial influence of this newly-found air (*the trade-wind*), which as yet was confined to the upper sails, and every one was looking open-mouthed to the eastward to catch a gulp of cool air, or was congratulating his neighbour on getting rid of the tiresome calm in which we had been so long half roasted, half suffocated, about a dozen Flying-fish rose out of the water, just under the fore-chains, and skimmed away to windward, at the height of ten or twelve feet above the surface. I have already mentioned, that the longest flight of these singular fish is about an eighth of an English mile, or two hundred yards, which they perform in somewhat more than half a minute. These flights vary from the extreme length, mentioned above, to a mere skip out of the water. Generally speaking, they fly to a considerable distance, in a straight line, in the wind's eye, and then gradually turn off to leeward. But sometimes the Flying-fish merely skims the surface, so as to touch the tops of the successive waves, without rising and falling to follow the undulations of the sea. There is a prevalent idea afloat, but I know not how just it may be, that they can fly no longer than their wings or fins remain wet. That they rise as high as twenty feet out of the water is certain, from their being sometimes found in the channels of a line-of-battle-ship, and they frequently fly into a seventy-four gun ship's main-deck ports. On a frigate's fore-castle and gangways, also, elevations which may be taken at eighteen or twenty feet, or more, they are often found. I remember seeing one, about nine inches in length, and weighing not less,

It should suppose, than half a pound, skim into the Volage's main-deck port, just abreast of the gangway. One of the main-top men was coming up the quarter-deck ladder at the moment, when the Flying-fish, entering the port, struck the astonished mariner on the temple, knocked him off the step, and very nearly laid him sprawling.

"No familiarity with the sight can ever render us indifferent to the graceful flight of these most interesting of all the finny, or rather winged tribe. On the contrary, like a bright day, or a smiling countenance, the more we see of them, the more we value their presence. I have, indeed, hardly ever observed a person so dull, that his eye did not glisten as he watched a shoal, or, it may be called a covey, of Flying-fish rise from the sea, and skim along for several hundred yards. There is something in it so peculiar, so totally different from every thing else in other parts of the world, that our wonder goes on increasing every time we see one take its flight; so that we may easily excuse the old Scotch wife, who said to her son, when he was relating what he had seen abroad 'You may hae seen rivers o' milk, and mountains o' sugar, but you'll ne'er gar (make) me believe you hae seen a fish that could flee!'

"I was once in a prize, a low Spanish schooner, not above two feet and a half out of the water, when we used to pick up Flying-fish enough about the decks in the morning to give us a capital breakfast. They are not unlike whittings in the taste, though rather firmer, and very dry; they form, I am told, a considerable article of food for the negroes, in the harbours of the West Indies. The method of catching them at night is thus described:—In the middle of the canoe a light is placed



THE DORADO, (*Coryphæna hippuris*) PURSUING THE FLYING-FISH.

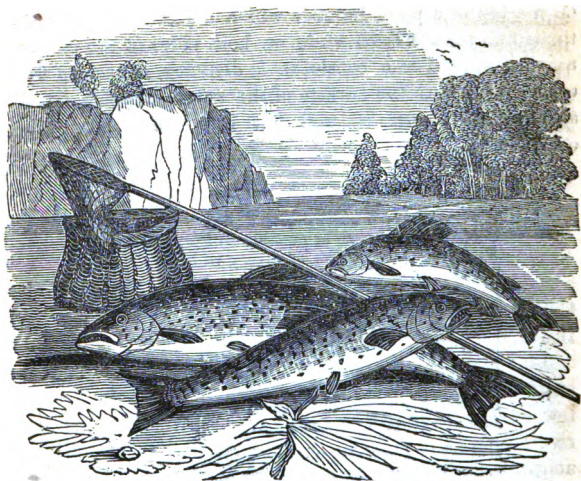
on the top of a pole, towards which object it is believed these fish always dart, while on both sides of the canoe a net is spread to a considerable distance, supported by outriggers above the surface of the water; the fish dash at the light, pass it and fall into the net on the other side.

LINES ON A FLYING-FISH.

WHEN I have seen thy snowy wing
O'er the blue wave at evening spring,
And give those scales, of silvery white,
So gaily to the eye of light,
As if thy frame were formed to rise,
And live amid the glorious skies;
Oh! it has made me proudly feel,
How like thy wing's impatient zeal,
Is the pure soul that scorns to rest
Upon the world's ignoble breast,
But spreads the plume that God has given,
And rises into light and heaven!

But when I see that wing so bright,
Grow languid with a moment's flight,
Attempt the paths of air in vain,
And sink into the waves again:
Alas! the flattering pride is o'er;
Like thee awhile the soul may soar,
But erring man must blush to think
Like thee, again, the soul may sink!

Oh! virtue, when thy clime I seek,
Let not my spirit's flight be weak;
Let me not, like this feeble thing,
That spreads awhile its splendid wing,
Just sparkle in the solar glow,
And plunge again to depths below;
But when I leave the graver throng,
With whom my soul hath dwelt so long,
Let me, in that aspiring day,
Cast every lingering stain away,
And, panting for thy purer air,
Fly up at once and fix me there!—MOORE.



THE SALMON TRIBE.

THE whole of this tribe is distinguished by having the first dorsal fin supported by soft rays, behind which is placed a second, extremely small and adipose, that is, consisting simply of skin filled with fat and without rays.

THE SALMON, (*Salmo salar.*)

THE Salmon is a fish so well-known, that any description of its form and colour would be useless; we shall, therefore, confine ourselves to an account of its habits, and of the mode in which it is taken. It is an inhabitant of the sea, but at stated periods enters rivers,

and ascends the stream for the purpose of depositing its spawn. In Great Britain, they begin to approach the coast, and enter the rivers as stragglers, about June, increasing in numbers towards July and August, when the drought and heat of summer render the streams unfit for their reception. At this period they crowd in shoals towards the coast, and roam about in the smaller arms of the sea, until the autumnal floods again entice them to enter the rivers. While thus detained on the coast, or near it, they are pursued and preyed upon by numerous herds of Seals and Grampuses, which consume many more than fall to the lot of the fisherman.

The early fish are in good condition, the roe being still small, and they seem to be destined to mount towards the higher and more distant branches of the river. Towards August and September, the roe has acquired such a size as to render the fish nearly useless as food, and greatly to limit the extent of its migrations.

Having arrived at suitable spawning-ground, Salmon pair, and proceed to the shallow, gravelly fords, at the top and bottom of pools, and there, in company, make their spawning-bed, which sometimes reaches from twelve feet in length to ten in breadth. This bed is furrowed, by the parent fish working up against the stream, and the spawn is deposited and covered at the same time. This process frequently occupies more than a week, during which, the eggs deposited by a single fish amount to many hundreds of thousands. The spawning season extends from the end of October to the beginning of February, and it occurs nearly about the same time throughout all the rivers of the United Kingdom.

The parent fish having thus accomplished the im-

portant purposes of their migration into the river, now retire into the deeper pools, whence, after remaining for a considerable time, they direct their course towards the sea, chiefly during the months of February, March, and April, the male fish appearing to migrate earlier than the females. The eggs of the Salmon remain in the gravel for several months, exposed to the influence of the running water. In the course of the month of March, and nearly about the same period in all our rivers, the young fry appear.

When newly hatched, they are scarcely an inch in length, of the most delicate structure, and for a time connected with the egg. Upon leaving the spawning-bed, the fry betake themselves to the neighbouring pools, where they speedily increase to two or three inches in length. In April, May, and June, they migrate towards the sea, keeping near the margin, or still water in the river; and when they approach its mouth, they betake themselves to a deeper and more sheltered course, and escape to the unknown haunts of their race, to return shortly after as *Grilse*, with the more aged individuals. All these seaward migrations of the parent fish and the fry are influenced and greatly assisted by the occurrence of floods in the rivers.

Speaking of the arrival of the Salmon in the fresh water, the Editors of the *French Dictionary of Natural History* say, "in France, the Salmon enter the rivers at the beginning of Autumn, that is, in September, and in the North of Europe at the beginning of the Spring. It appears that in America and Kamtschatka it is still later before they leave the sea. It is almost always during a strong wind and a high flood, that the Salmon enter the mouths of the rivers they frequent. Salmon

always endeavour to return to the river in which they were spawned, and nothing b̄t the most invincible obstacles will make them change their course. In ascending rivers, if these fish meet with a fall of water or a dike opposing itself to their course, they make the most desperate efforts to overleap it. To perform their leap, they bend their tail into a curve on one side to as great an extent as possible, and then strike the surface of the water with it with violence, springing forward at the same instant." A Salmon will frequently fail in its first attempt to overleap the obstacle, and of course, fall back again into the water, but not in the same spot from whence it sprung, but, at times, very much on one side of it; and once a very cruel but ingenious plan was resorted to for the purpose of taking one of these unsuccessful leapers. A fire was kindled, and a large fish-kettle placed on a projecting ledge of rock near the sides of the Salmon-leap, into this kettle one of these unwary fish fell, and was scalded to death and cooked on the spot. The usual height to which they leap in fresh water is about five or six feet above the surface; but near the sea, it is said, they spring as high as fourteen feet, this has been ascertained at the fishery of Ballyshannon in Ireland. This greater power most likely arises from the greater strength of the fish it having at that time only just left the sea.

Ice, wood, and in general, any thing that floats on the water, frightens the Salmon, and prevents their continuing their course. On the same account, they avoid rivers the mouth of which is surrounded by buildings, but they prefer those whose banks are covered with trees, the shade of which is agreeable to them. The true Salmon has never been taken in any river that falls into the

Mediterranean, and the species was quite unknown to the ancient Greeks and Romans.

The value of these fish as an article of food has latterly become so great, that many laws have been at different times made for their preservation. In former times, however, they were taken in much larger quantities than they are at present. Bloch says, that in 1750, as many as three thousand five hundred fish were taken at one draught in the river Ribble, in Yorkshire. And many years ago it used to be stipulated on the part of a servant when hired, that he should not be obliged to eat salmon more than three times a week.

Salmon are not only taken by different kinds of nets, which are directed by the hands of the fisherman; but also by many contrivances which are fixed in the water, as for instance, baskets of osier, into which the fish easily enter, but find it impossible to retreat. In some rivers stake-nets are used to intercept the progress of the fish; but these are in general forbidden, as they interfere with the right of fishing on other parts of the stream.

As the fishing for Salmon, or indeed any other river-fish, is illegal from Saturday night to Monday morning, it was decreed in many instances that these stake-nets should be partially left open during this time to allow the Salmon to pass. This opening was formerly called, in Scotland, the Saturday's *sloppe*, or gap.

Alexander the First enacted, "That the streame of the water sal be in all parts swa free, that ane swine of the age of three zears, well feed, may turn himself within the streame round about, swa that his snout nor taill sal not touch the bank of the water."

Drag-nets are also naturally forbidden at the time the young are being hatched, on account of the damage they

do to the young fry. For as a fisherman once said, "You might just as soon have a bed of onions come to perfection if a *coble-net* and rope was dragged over it, tearing up the mould twenty times a day."

In order to drive these fish into the nets, it was once seriously proposed by the Corporation of Limerick that something in the shape of a Crocodile or of an Alligator, painted with very glowing colours, should be prepared so as to frighten the Salmon.

A person named Graham, who farmed a sea-coast fishery at Whitehaven, adopted a successful mode of taking Salmon, which he appropriately called Salmon-hunting; when the tide is out, and the fish are left in shallow waters, intercepted by sand-banks, near the mouth of a river, or when they are found in any inlets up the shore, where the water is not more than from one to four feet deep, the place where they lie is to be discovered by the agitation of the pool. This man, armed with a three-pointed barbed spear, with a shaft fifteen feet in length, would mount his horse and plunge at a quick trot or moderate gallop into the water. He made ready his spear with both hands. When he overtook the Salmon, he let go one hand, and with the other struck the spear, with almost unerring aim into the fish. This done, by a turn of the hand, he raised the Salmon to the surface of the water, turned his horse's head to the shore, and ran the fish on dry land without dismounting. This man said that he could kill from forty to fifty in a day; ten, however, are considered no bad day's work for a man and horse.

Although Salmon and most other fish are generally taken when the roe is nearly mature, and although custom induces us to suppose that a full-roed fish is the

best, because we are perfectly satisfied it is at the worst immediately after spawning, yet a proper examination of these creatures in their different stages will prove that they are in the finest condition when they are in their retreats in the depths of the sea ; those, therefore, which are taken on their first appearance, at the entrance to the river, are in a better state for food than at any subsequent period, for the roe is now not perfectly formed, and the fleshy parts with which it is surrounded are covered with fat. As the roe increases, the fat disappears, and the epicure who relies on the fish being in excellent season, will, on inquiry, find that he is deceived. -

Full-grown male Salmon have the under jaw curiously turned up like a hook ; this character is most perceptible in autumn, towards milting-time, and almost disappears in winter and spring.

The different species of the old genus *Salmo* are at present far from being well determined, the various qualities of their food, and the state of the water they inhabit, producing a great variety in their markings and size. We shall, therefore, only enumerate a few of the principal British species, and conclude with an account of that well-known fish, the fresh-water Trout.

After the common Salmon, the Sea-Trout (*Salmo trutta*), is next in magnitude, and may be at once distinguished from the Salmon by the tail, which is square or flat at the end, while the tail of the Salmon is somewhat forked.

The CHARR (*Salmo salvelinus*), is found in the lakes of Cumberland, Westmoreland, and Scotland, as well as on the European continent. This fish is frequently preserved and potted.

The **GWINNAD** (*Salmo lavaretus*,) is also a native of our northern lakes.

The **GRAYLING** (*Salmo thymallus*,) is chiefly found in the rivers of Hampshire, Wiltshire, and Dorset.

THE COMMON TROUT, (*Salmo fario*,)

Is distinguished by the red spots on its body, which, however, are not always arranged in the same manner, nor equal in brilliancy.

It is a favourite fish with anglers, both on account of its good qualities as an article of food, and from the amusement it affords in its capture. Walton says,

"The Trout is a fish highly valued both in this and foreign nations, he may be justly said, as the old poet said of wine, and we English say of venison, to be a generous fish: a fish that is so like the Buck that he has his seasons; for it is observed that he comes in and goes out of season with the Buck. He is a fish that feeds clean and purely, in the swiftest streams, and on the hardest gravel; and he may justly contend with all fresh-water fish, as the Mullet may with all sea-fish, for precedence and daintiness of taste; and, being in right season, the most dainty palates have allowed precedence to him."

The following account of a Trout that was confined in a small pond at Newbury, in Berkshire, gives an amusing description of its habits. It must be understood that *Fuller* was the name given to the Trout.

"In about a twelvemonth **FULLER** grew from three pounds and a half to about nine pounds, and would probably have been heavier, had he been supplied abundantly and regularly with food: for in about six months,

that is, from March to October 1809, he added five pounds to his weight; but during this latter period greater attention was paid, and more food given him: his length from nose to tail is now, October 1809, twenty-seven inches. *Fuller's* food consists of worms, minnows, or, upon a failure of such provisions, the entrails of a calf finely chopped. But he neglects all these dainties during the day, unless pressed by hunger. About an hour before it is dark, he begins to move about, then is the time to throw in his food, and then he begins to exercise his ridiculous tyranny over his subjects; like a beast of prey, he chooses to feed alone; he makes an ample meal, but does it leisurely, as if to prolong the pleasure of eating.

"There must be something peculiar in the expression of his eye, by which he betrays his temper, and shows anger or a peaceful disposition. For as soon as the Minnows, which are a little bruised, to render them less active, are thrown into the stew, *Fuller* seems to look round at his subjects, when they, though previously lying quietly round him, instantly dart into hiding-places, provided purposely for them; and he deliberately sails round, to see that they are beyond his reach; he then leisurely swallows a Minnow or worm, and again makes a voyage to survey his prisoners. He then goes through with his repast, which consists of about one hundred and twenty-five Minnows. If any of his humble comrades, whom he has driven from the feast, more presumptuous or more hungry than the rest, dare to trespass beyond their prison, they are immediately repulsed by the surly epicure. When he is satisfied, he seems quiet, and often moves from the scene of his

repast, yet sometimes he remains near it; in either case, the other Trouts perceive that they have permission to pick up the crumbs, and at once rush out to seize what they can. A scene of complete scrambling now begins, they dart about with amazing agility, and soon devour all he may have left. After this, they resume their stations, not retiring to their hiding-places, but each to a spot which he seems to select for himself as soon as he is placed in the stew, and is convinced he cannot escape. *Fuller* and a small one keep close together, and have occupied the same tenement for three months, except when purposely disturbed, at meal times, or when the wind blows. Whilst the surface of the water is ruffled, they move very briskly, whether from alarm or pleasure I know not, but perhaps instinct tells them, 'It is an ill wind that blows no good;' and they may expect some insects may be shaken into the water."

THE HERRING TRIBE.

OF all the productions of the waters, none equal the Herrings in utility and in numbers; in many parts of the world they form a very considerable portion of the animal food consumed by the poorer classes, and afford a most nutritious and palatable addition to the scanty fare of the cottager. The immense numbers in which they appear, and their wonderful powers of reproduction have been already noticed in the introduction; we shall, therefore, confine ourselves to a description of some of the principal species, and of the different modes of taking and curing them.

THE HERRING (*Clupea Harengus.*)

THE name of this fish is said to be derived from the German word *heer* (an army), in allusion to the immense shoals in which they make their appearance.

Some idea may be formed of the value of the Herring-fishery, from the acknowledged fact that the prosperity, and almost the existence of the Dutch nation, is to be attributed to their persevering labours in the taking of these fish. It is still a common saying that the city of Amsterdam is founded on Herrings' bones.

The first discovery of the method of salting and preserving the Herring is a disputed point between the fishermen of Yarmouth and the Dutch. The continental writers, however, assert that we are indebted for it to a fisherman named William Beuckals, or Buckalz, who died at Biervliet, in Flanders, in the year 1447.

The native country of Buckalz acknowledged the value of his services by erecting a tomb to his memory; and his countrymen boast that in the year 1556, when Charles the Fifth passed through Biervliet with his sister, the Queen of Hungary, he partook of a Herring on the spot, the stone of the monument serving him for a table.

The method pursued by Buckalz is still employed by the Dutch, and their Herrings are considered preferable to those of any other country. It is as follows:—As soon as the Herrings are taken out of the water, their throat is cut, and the gills and entrails removed; they are then washed with salt water, and placed in brine sufficiently strong to cause them to float; fifteen or eighteen hours afterwards, they are removed from the pickle and placed in layers in a barrel, together with a large quantity of salt: they remain in this state until

the vessel reaches her port. They are then taken out and arranged carefully in barrels, fresh salt being added, together with newly-made brine. In constructing these barrels, they always employ oak timber. Bloch, however, says, that the Norwegians use fir, to give the fish a resinous taste, which is very much admired in some parts of Poland.

The method described above produces what are called White Herrings, or Dutch Herrings; the Red Herrings are prepared in a different manner. After they are cleaned, they are allowed to remain at least twenty-four hours in the brine; they are then fastened by the gills to short sticks, and hung up in a kind of chimney, in which a fire of damp wood is lighted. They remain here until they are sufficiently dry, which is generally in about twenty-four hours. The largest and fattest fish are always chosen for this purpose. In some cold countries, as Iceland and Greenland, they are dried in the open air, without being previously salted.

In Sweden and some other parts of the continent, the oil of the Herring is employed for various purposes: to procure this oil, the fish are placed in large caldrons, capable of containing nine or ten tuns of fish, and the same quantity of water. While the Herrings are boiling they are kept constantly stirred, and when sufficiently cooked, in about five or six hours, a stream of cold water is introduced into the boiler, which causes the oil to float. It is then skimmed off with large copper ladles, and placed in barrels, where the heavier parts of the impurities are allowed to settle; it is afterwards strained and placed in barrels formed of oak. The chief difficulty in preparing this oil is the removal of the im-

purities; and its value depends almost entirely on its state of purity.

The greatest consumption of this fish takes place in Catholic countries, on account of the numerous fast-days, when fish is the only article of animal food allowed to be eaten. In England, although many boats are employed in the trade, the fishery never seems to have made any very considerable progress, and to have been supported chiefly by means of the bounty allowed on every barrel exported.

THE WHITE BAIT, (*Clupea latulus*, Cuv.)

THIS little inhabitant of the waters has been the cause of much dispute: by some it was supposed to be the young of the Bleak, others believed it to be a species of Herring; at length it was decidedly said to be a young Shad. For a long time this decision was considered to have set the question at rest: at length, a paper by Mr. Yarrell, in the *Zoological Journal* of London, clearly proved the fish to be a distinct species; and far from being a Shad, it differed, perhaps, more from that fish than from any other which it had been supposed to resemble; for the young of the Shad is much deeper in the body than the White-bait, and at the same time the dark marks on its sides are visible, even in the smallest specimens; the tongue, also, of the largest Shad is smooth and dark coloured, while that of the smallest White-bait is rough and pale.

The White-bait was supposed to exist in no other river but the Thames; but it has latterly been found in nearly all the rivers of England, particularly in those of the southern and eastern shores. The largest specimen of this fish ever taken did not

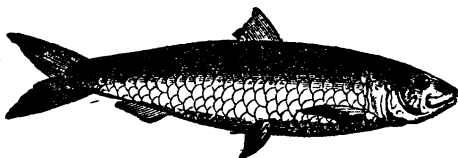
exceed seven inches in length. It is only in the river Thames that it is taken for the purpose of food; it is there found from the end of April to the end of August, as high as Blackwall, and as low as Woolwich; it has, however, sometimes been taken as far down the river as Erith. The inns and taverns of Greenwich and Blackwall are noted for their mode of cooking the White-bait, and numerous parties are formed for the purpose of eating this dainty. The mode of taking it is by means of nets with very small meshes, formed like a long bag, wide at the mouth, gradually tapering off, and ending in a kind of pocket. The mouth of this net is kept open by means of a framework of wood; it is then thrown over the side of the boat, which remains at anchor, and secured in such a manner as not to allow it to sink more than about a foot beneath the surface of the water; the young fish which float rather than swim, are carried by the tide into the mouth of the net, and eventually into the pocket at the end, from which they are taken from time to time by the fisherman, who is enabled to shake them out by untying a string which closes its extremity.

This mode of fishing is considered illegal, both on account of the small size of the meshes of the net, and of the mode of using it; and until it was ascertained that the White-bait was not the small fry of a larger fish, many serious affrays took place between the fishermen and the persons appointed to look after the river.

Perhaps the most decided proof of the White-bait and the Shad being distinct, is the fact of young White-bait being taken in the Thames nearly three months before the arrival of the Shad in the river

THE PILCHARD, (*Clupea pilchardus*,)

DIFFERS from the common herring, chiefly in being rather shorter in the head, and thicker in the body, and in having its dorsal or back-fin, somewhat more forward; but it may be more readily distinguished by its scales, which are nearly half as large again as those of a herring of the same size. It is found during the



months of August and September, in great shoals, or *sculls*, pronounced *schools* by the fishermen, on the south-west coast of England, and affords employment, for a time, to a great number of boats and men, belonging to the fishing-towns of Cornwall. This fish is also met with off the French coast, and other parts of Europe; but its chief place of resort appears to be the coasts of Cornwall and Devon. The Pilchard is rarely met with in the London markets, but there is a fish, found sparingly among the sprats, which has obtained its name, though in reality, it is merely a small, and we believe, undescribed species of herring. The value of this fishery was well known as long back as the reign of Elizabeth, when an Act of Parliament containing the following clause, was passed:—

Statute of 35th Elizabeth.—"No stranger should transport beyond seas, any Pilchard or other fish in cask, vnlesse hee did bring into the realme for every

sixe tunnes, two hundred of clap boord fit to make cask, and so rateably, vpon payne of forfeiting the sayd Pilchard or fish."

The reason the *stranger* was obliged to bring in a certain quantity of wood, appears to have arisen from the circumstance of Cornwall being nearly without timber of any kind.

There are several signs by which the presence of a shoal of Pilchards may be known; the luminous appearance of the sea at night, the number of birds of prey which accompany it, and, when seen from a moderate distance, the appearance of the water, which seems for miles around to be, as it were, boiling or bubbling.

When the annual visit of the Pilchards is expected, to prevent their passing unnoticed, men are continually on the alert, watching from all the elevated spots on the coast, from which stations they are also able by signs to direct the operations of their friends at sea, so that they may be enabled to enclose as many of the fish as possible. The largest net which is employed, is called a *seine*, and is upwards of sixty fathom (three hundred and sixty feet,) in length, and thirty-six feet in depth; the lower part of this net is kept down by means of leaden weights, while the upper floats on the surface, being rigged out with a number of corks; if one of these nets is found to be insufficient for the purpose of surrounding the shoal, a second, or even a third, is attached to it. The *seine* now forms a kind of wall, within which the fish are enclosed, and the object of the fishermen is to bring this net as near as possible to the shore, so that at low water, the fish shall have all means of escape cut off, except by over-leaping the net. As soon as the tide is out, a net called a *truck-net*, which differs from

the *seine* in being smaller, and without leads, is cast among the Pilchards, and, cords being attached to its four corners, it is hauled on shore, along with as many fish as it may happen to contain; and this is repeated until the whole of them are taken or have made their escape.

While these means are employed for the capture of the larger quantity, other boats are engaged in taking the scattered parts of the shoal by means of driving-nets. The boats and nets of the *seiners*, being very expensive, are generally provided by some capitalist or company of proprietors, and the men during the season are paid a small weekly sum, and also a certain portion of the captured fish. As soon as they are brought on shore, they are carried off in baskets to the curing-house, where they are carefully laid in rows one above the other, with alternate layers of salt, till a pile of considerable height is formed. They are said now to be in *bulk*, as seen in the frontispiece, on the left hand, and are allowed to remain in this state from a fortnight to five weeks. During this time a quantity of brine and oil has drained from them, which runs off through gutters in the floor, and is carefully collected; they are next thrown into a large wooden trough, which contains a false bottom, formed of battens or long strips of wood, and are freed from the salt and impurities that are attached to them; they are now very carefully and neatly packed in hogsheds, arranged in circles, one within the other, the heads all pointing inwards.

As soon as the hogshed is full, a circular board is placed on the top of the fish, and they are pressed very closely together by the application of heavy weights, in the simple manner shown in the engraving, the

weights being large blocks of granite. This pressure reduces the bulk of the fish by nearly one third, and the hogshead has to be filled up three times before it is considered well packed. A quantity of pure oil runs off, during this part of the process, through a small hole in the bottom of the cask. It is calculated that a hogshead of Pilchards which weigh about four hundred weight and a quarter, will yield from three to four gallons of oil, worth about 17*l.* a tun, or rather better than 1*s.* 4*d.* a gallon.

The oil is used in the manufacture of cart-grease, and for many other purposes to which the commoner kind of whale-oil, called train-oil, is applied. Attempts have been made to purify this oil, so as to render it serviceable to the currier, but hitherto without success, on account of the quantity of salt and glutinous matter which it contains. The Pilchards, when thus packed, are exported chiefly to the West Indies, for the use of the slave-population, and to different parts of the Mediterranean; they are likewise salted and dried in great quantities for winter-provision, by the poorer classes in Cornwall and Devon.

The myriads of fish that a shoal of Pilchards contains, are almost beyond the power of calculation; some of the shoals will form almost solid masses, covering a surface frequently of six square miles, and extending in depth upwards of one hundred feet. In successful times, as many as from five to seven hundred hogsheads have been taken from one shoal. The annual value of the fish that are exported is from fifty to sixty thousand pounds.

The appearance of a shoal of Pilchards on a dark night, when enclosed by the nets, is splendid beyond

description; struggling and leaping in every direction, to escape from their confinement, or to avoid the attacks of their numerous enemies (particularly the Dog-fish), who are imprisoned along with their victims, they appear like so many flakes of fire, and the sea itself seems like a lake of liquid flame.

The Pilchard Fisheries, according to evidence laid before a Committee of the House of Commons, appear, of late years, to have decreased considerably. Several causes have tended to produce this state of the fishery; among others, the removal of a bounty of 8s. 6d. a hogshead, which had been paid to the exporters till within this five or six years, and the high duty imposed by the Government at Naples, to which place large quantities were exported; this at present is as much as 18s. 2d. a hogshead.

The fishery is also injured by the illegal practice of employing drift and other nets too near the shore, by which means the shoals are dispersed as they approach. It is likely, however, that the statute of the 14th of Charles II. will soon be more strictly enforced. This Act imposes a fine upon all persons who "shall in any year, from the first of June till the last day of November, presume to take fish in the high sea, or in any bay, port, creek, or coast, of or belonging to Cornwall and Devon, with any drift-net, trammel, or stream-net or nets, or any other nets of that sort or kind, unless it be at the distance of one league and a half at least from the respective shores."

The number of boats at present engaged in this fishery is about 1000, giving employment to 3500 men at sea, and upwards of 5000 men, women, and children, on shore.

THE SARDINIA, (*Clupea sardina*.)

THE Sardinia very nearly resembles the Pilchard in form and in the size of its scales, but it is a much smaller fish, seldom exceeding six inches in length; it is said to have taken its name from the island of Sardinia, but singularly enough, Azuni, in his history of that island, says, that these fish are seldom taken there by the fisherman, and never in any great quantities. Like all the Herring tribe, the Sardinias are found in immense shoals, and at the time of their appearance provide a most lucrative employment for the fisherman.

The mode of curing them is precisely the same as that employed for the Herring, which they greatly resemble in flavour, but they can only be eaten in a fresh state on the sea coasts, on account of their so rapidly becoming unfit for food. Their chief places of resort are the coast of the Mediterranean and the southern shores of France. The fishermen of Bretagne prepare a kind of bait from the roes of Cod and other fish, which they throw into the sea for the purpose of detaining the Sardinias longer on the coast.

THE SHAD, (*Clupea alosa*.)

Is the only species of the Herring tribe that ascends rivers for the purpose of depositing its spawn. In England it is taken in most of our rivers in the months of June and July; it is found in almost all parts of the world, and abounds in most of the rivers of Europe. In the Mediterranean the fishermen have a notion that the Shads are attracted by music, and in order to induce them to enter the nets, they hang little bells to

the floats, a practice which, perhaps, conduces to the safety of many of the fish, by warning them of danger. It is, however, affirmed by Rondelet, a French physician and author of a work on fishes, who flourished at the beginning of the 16th century, that he has seen them attracted by the sound of a lute, leaping about and swimming near the surface of the water.

In England the Shad is considered but indifferent eating, while the Herring is a favourite dish. In America, directly the reverse of this takes place, the Shad being considered a delicacy.

THE ANCHOVY, (*Engraulis encrasicolus*.)

THE Anchovy never reaches more than a span in length, but although much smaller than either of the fish we have last mentioned, it is much more valuable as an article of commerce. This arises from the great quantity that are consumed in the preparation of "Anchovy sauce." In the Mediterranean they are chiefly taken



THE ANCHOVY, (*Engraulis encrasicolus*.)

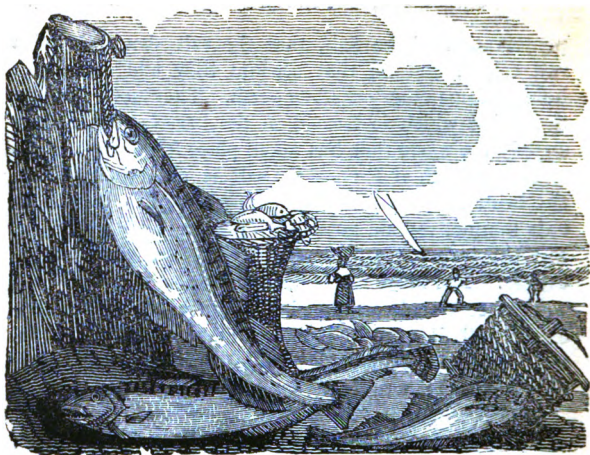
at night; a large fire is lighted on a raft, which attracts the fish, who are then surrounded with a net and taken in considerable numbers. The greatest portion are salted on the spot: to this end the head is first cut off and the entrails removed; they are then washed and laid in rows in barrels, with salt between each stratum. In Provence, they think it essential to the

preservation of the fish, that the salt should be of a red colour, and on that account they add Armenian bole or some other ochreous earth. They never change the brine which is formed in the barrels, but merely supply the waste that has taken place from evaporation.

In the north of France the salt is not coloured, and the brine is changed several times; the fish treated in this manner remain good for a greater length of time, but they are not considered so finely flavoured as the others. The head also is not removed.

It is commonly supposed that the bones of the Anchovy will dissolve in boiling water; but the fact is, they are only separated from each other, and being very small are not readily observed.

The Anchovy is caught in the months of May, June, and July, on the coast of Catalonia, Provence, &c., at which season it constantly repairs up the straits of Gibraltar into the Mediterranean, where it is taken in large quantities. The great fishery is at Gorgona, a small island west of Leghorn. Near a century ago this fish was found at the mouth of the river Dee, by Mr. Ray, but since that time it has been very rarely met with on our coasts.

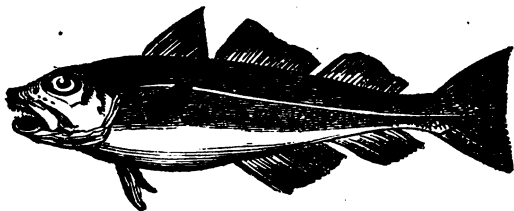


SOFT-FINNED FISHES,
WITH THE VENTRAL FINS UNDER THE PECTORAL, AND
ATTACHED TO THE BONE OF THE SHOULDER.
(Order, MALACOPTERYGII SUBBRACHIATI.)

THIS order contains three principal groups, the fishes allied to the Cod ; Flat-fish, as Turbots, Soles, &c., and the Sucking-fishes.

The best known, most numerous, and at the same time most useful of the Cod kind, is the species figured above ; it is the fish so commonly seen at the fish-mongers' shops, and may be distinguished from the rest of its tribe by the well-defined white line down its sides. The Cod is an inhabitant of the ocean, and the chief places it resorts to at the spawning season are, the great Bank of Newfoundland, Cape Breton,

Nova Scotia, and New England in America; and Norway, Iceland, the Dogger-bank, and the Orcades in Europe; it is, however, taken in considerable numbers on all the coasts of Europe and America, between the latitudes of 40 and 60 degrees north.



THE COD, (*Gadus Morhua*.)

The fish that are taken on the European coasts are most generally brought to market for immediate consumption; it is therefore necessary, as they have frequently to be brought a considerable distance, to endeavour, if possible, to keep them alive during the voyage. For this purpose, all the fishing-boats employed have a small chamber called a *well*, formed in the lowest part of the hull; this chamber is full of holes, to admit the sea-water, and in order that the fish may remain at the bottom of the well, and to prevent their destroying themselves by violent endeavours to escape, the air-bladder is pierced by a small pointed steel instrument, and the air allowed to escape. It is also necessary to take them with hooks instead of in nets, as, if they were taken in the latter manner, they would be inevitably suffocated, from the injuries they receive in being removed from the water.

The fish which are taken at the great fishing stations are salted in different ways, for the sake of preserving them, and the traffic is so great, that upwards of six thousand vessels of different nations visit the Bank of Newfoundland alone in the course of the year, for the purpose of fishing, the greater number of these being British. Great quantities of the fish are also taken on the northern coast of Norway; and as the mode of preparing them is much the same in most places, we cannot do better than extract the following account from the work of Sir A. De Capel Brooke.

“When a sufficient number of boats have arrived, the fishermen hold a consultation as to the propriety of commencing operations. They next proceed to choose an admiral, to whom all disputes arising chiefly from encroaching on each other's fishing-ground are referred; and if this be insufficient, the matter is generally settled by one of the merchants of the Lofodens.

“The greatest proportion of the fish are caught in nets, placed perpendicularly in the sea, at the depth of 50, 100, and 150 fathoms, according to the banks. The nets being set in this direction in the evening, the fish approach the coast in millions. Shaping their course, as they invariably do, towards the south, and not seeing the nets, they run their heads into the meshes, which are made large enough for that purpose, but not of a size to admit the body. Finding their progress thus interrupted, they attempt to recede, and are caught by the gills.

“If possible, all the Cod taken are hung up for *rund fisk*, round or whole fish, in other words stock-fish, this kind bringing the best price: and it is only towards the end of the season, when the weather is becoming too

mild to harden or dry a fish whole, that it is slit open, the back-bone taken out, and then hung up to dry, when it is called *rots kiar*, or split fish. The heads that are cut off are not thrown away, but are carefully made up into bunches, hung up in like manner to dry, and then taken home, where they are kept as food for the cattle during the winter, being boiled up for them along with what little hay they may have left, and forming a kind of fish-soup. The roes are also taken out, packed in barrels with layers of salt between them, and sent to the place of exportation. The livers are taken home in barrels, which are allowed to stand as long as possible to produce the clearer kind of oil; this, which is called *blank tran*, or white oil, exudes from the liver by its own pressure, and is the most valuable. The livers are afterwards boiled up in large caldrons, kept constantly stirring, and the oil, as it rises, is skimmed off and barrelled. The oil thus obtained is called *brune tran*, brown oil, and does not fetch in general so good a price as the former. Five hundred Cod-livers are reckoned to make a barrel of oil of thirty-six gallons, and it must certainly appear very singular, that the whole of the great quantity of oil exported yearly from Norway, amounting to at least 30,000 barrels, with a very trifling exception, should be produced from the liver of so small a fish as the Cod. This oil is principally sent to Holland, where it is used in the currying of leather.

“ Besides the stock and split fish, there is another manner of curing the fish at the Lofodens, in which a great deal of business is done, by merely laying them on the rocks to dry, when they are called *klip fisk*, or rock fish. This is done chiefly for the Bergen and Drontheim

merchants, who, during the season, send small sloops to the different islands, and purchase the Cod thus exposed, which are then salted and loaded in bulk in the vessel. They are taken out when the vessels reach the main land, well washed, pressed, and again laid on the rocks till thoroughly dried. Near 5000 boats, and 25,000 men are employed in this fishery, giving bread and support subsequently to more than four times this number.

“ The method of keeling or stowing the stock-fish in the vessels for exportation, forms a very singular feature in this trade. The fish, after it is sufficiently dried, has the head and tail cut off, that it may be wedged with greater facility. It is piled up in tiers in the vessel, and laid alternately head and tail together. When the fish are thus piled up on the deck, they drive a number of *fids*, or pointed pieces of wood, between them in all directions. These being taken out leave each a space for four or five fish, which are put in and driven close with repeated blows from large heavy mallets. This process is repeated till the tier of fish becomes as solid as the sides of the vessel. The power this method of wedging possesses is almost incredible, the deck and thick beams being actually driven sometimes three or four inches from their places. The stowers who have been employed all their life-time in this work, consider the fish well stowed when one of these *fids* takes sixty blows of the mallet to drive it in. The whole of this process is so tedious, as well as laborious, that it is considered a great performance to load a ship of 150 tons burden in less than three weeks or a month.”

The fish which are taken on the bank of Newfoundland by the British fishermen, after having the head and

intestines removed, are placed in brine for eight-and-forty hours, they are then dried for a few days on poles, and afterwards packed in barrels, with the addition of dry salt. They are said to be not quite so white as those prepared by the Dutch, but much superior to the French and American fish. The roes and melts of the Cod are salted, and used for bait in catching various kinds of fish; the swim-bladders are sometimes salted for consumption, and at other times a kind of isinglass is made from them, so that every part of this useful fish is turned to account.

THE SEY, OR COAL FISH, (*Gadus Carbonarius*,)

Is another species of the Cod tribe taken on the European and other coasts, but is considered much inferior to the Common Cod. It is not quite so long as this fish, though exceeding in size the whiting and even the haddock, and takes its name from the dark colour of its back. On the coasts of Norway it appears to be much more numerous. The author we have lately quoted, says,

“It was a curious sight to see the astonishing shoals of the Sey, or Coal-fish, spreading themselves along the surface of the water blackened by their numbers, and pursued by hosts of their unrelenting enemies. The Common White Gull, the Herring Gull, and the Black-backed Gull, all united against these little creatures; which, forced out of the water by the closeness of their ranks, were snapped up by the birds. These, in their turn, while carrying away their booty, were pursued by the voracious Arctic Gull, which compelled them to relinquish their prize.

THE LING, (*Gadus molua*)

INHABITS the same seas as the Cod, and is a common frequenter of the British coasts. It is salted and prepared in the same manner as the Cod, and may be considered, next to that fish and the Herring, as one of the principal sources of wealth bestowed on mankind by the sea. From Norway, in particular, a large quantity are annually exported.

A fish nearly resembling the Ling, if not the same, is found also on the coasts of North America. The Ling taken near Spitzbergen and Newfoundland are not considered equal in quality to those found in the European seas. In Great Britain the fishery takes place from the beginning of February to the end of May, before they deposit their spawn. Their food consists of Crabs and small fish, particularly the young of the Plaice. The flesh of the Ling is extremely fat, and the livers yield a considerable quantity of oil.

THE FLAT FISH TRIBE.

THIS group forms the family of the Pleuronectes. This name is derived from two Greek words meaning the side and to swim, because these fish swim as it were on their side. The side on which they swim is sometimes the right, and at other times the left; but most frequently the latter.

To describe the appearance of the Flat-fish, it has been remarked, that after being flattened, they appear as if they had been twisted in such a manner as to bring the eyes and one half the body to one side, and to

leave the other deprived both of sight and smell. Not only are the eyes placed on the same side, but they often present another irregularity in their unequal size. Sometimes the upper eye is the largest, and sometimes the under. The position of them also varies: sometimes they are in a straight line, and at others one or the other is much nearer the end of the nose than its companion. The large back fin, which extends the whole length of the body, enables them to rise in the water with great rapidity, although they are without a swim-bladder. These fish, in general, remain at the bottom of the water, or buried in the mud, and in this manner they escape many of their enemies, and lie in wait for their prey.

Most of the species belonging to this tribe are well known, and extremely common on all our coasts, and in most of our rivers. The principal are the Plaice, the Holibut, the Turbot, and the Sole.

THE HOLIBUT, (*Pleuronectes hippoglossus*.)

THE Holibut is one of our largest flat-fish, attaining sometimes the length of six or seven feet, and weighing as much as three hundred weight. It is not equal to the Turbot or Sole in flavour, but from its large size, and great plenty, it is taken in considerable numbers by the fishermen of the nations of the north of Europe, by whom it is salted and dried for winter-store. In the British seas it is only occasionally taken.

They are generally taken with hooks and lines. The Greenlanders employ the membrane of the stomach of the Holibut in place of glass for their windows. The Swedes and Icelanders make of these fish what they

call *raff* and *ræchel*: the first consists of the fins, to which they are much attached, and the latter of pieces of the flesh cut into stripes.

THE TURBOT, (*Rhombus maximus*.)

THE Turbot is the most valuable of all the flat-fish. It is in general taken with hooks and lines, but on some of the sand-banks between the coasts of England and Holland, nets of an extremely large size are used, and great quantities of the fish are at times taken.

“In fishing for Turbot off the Yorkshire coast, three men go out in each of the boats, each man provided with three lines, every one of which is furnished with two hundred and eighty hooks, placed exactly six feet two inches asunder. These are coiled on an oblong piece of wicker-work, with the hooks baited and placed very regularly in the centre of the coil. When they are used, the lines are generally fastened together, so as to form one line with above two thousand hooks, and extending nearly three miles in length. This is always laid across the current. An anchor and buoy are fixed at the end of each man's line. The tides run here so rapidly, that the fishermen can only shoot and haul their lines in the still water at the turn of the tide; and, therefore, as it is flood and ebb about every alternate six hours, this is the longest time the lines can remain on the ground. When the lines are laid, two of the men usually wrap themselves in the sail and sleep, whilst the third is on watch to prevent their being run down by ships, and to observe the weather.

“The boats used in this work are each about a ton burden; somewhat more than twenty feet in length,

and about five in width. They are well constructed for encountering a boisterous sea, and have three pair of oars, and a sail, to be used as occasion requires. Sometimes larger boats than these are used, which carry six men and a boy. When the latter come to the fishing-ground, they put out two of the smaller boats that they have on board, which fish in the same manner as the three-manned boats do, save that each man is provided with a double quantity of lines; and, instead of waiting in these the return of the tide, they return to the large boat, and bait their other lines: thus hauling one set and shooting another, at every turn of the tide. The fishermen commonly run into harbour twice a week, to deliver their fish.

“The bait that the Turbots take most readily is fresh Herring, cut into proper-sized pieces; they are also partial to the smaller Lampreys, pieces of Haddock, Sand-worms, Mussels, and Limpets; and when none of these are to be had, the fishermen use Bullocks' liver. The hooks are two inches and a half long in the shank, and nearly an inch wide betwixt the shank and the point. They are fastened to the lines upon sneads of twisted horse-hair, twenty-seven inches in length. The line is made of small cording, and is always tanned before it is used.

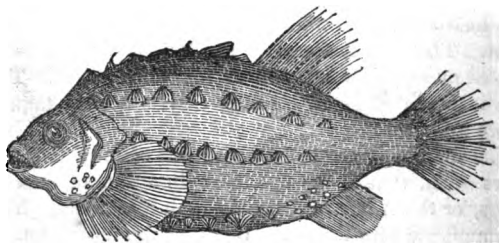
The voracity of these fish in pursuit of prey, is oftentimes such, that it carries them into the mouths of rivers, or the entrance of ponds in salt-marshes, which communicate with the sea. But they are not contented with merely employing agility and strength in the procuring of their food, they likewise have recourse to stratagem. They plunge themselves into the mud or sand at the bottom of the sea, and cover their whole

body, except their eyes and mouth. Thus concealing them they seize upon, and devour all the smaller kinds of fish which incautiously approach them. It is said they are very particular in the choice of their food, refusing, more or less variably, all except living animals, or such as are not in the least degree putrid. And the fishermen assert, that they are never to be caught with baits which have been bitten by other fish."

THE SUCKING FISH TRIBE.

THE LUMP-FISH, (*Cyclopterus lumpus*.)

THE Lump-fish is singular from the curious manner in which its two ventral fins are united, forming a round hollow disk like an inverted saucer. This arrangement of the fins enables the creature, who is not very active in



THE LUMP-FISH.

its motions, to hold fast to the rocks while waiting for its prey. The mode in which the fin acts is precisely the same as in the case of a cupping-glass, or rather

the piece of wet leather at the end of a string, called by children a sucker.

The Lump is not usually considered a fish fit for eating, but this most likely arises from its uncouth appearance, and its scarcity. It is found in England on the southern coasts.

THE SUCKING-FISH, (*Echeneis remora*.)

THE Sucking-fish beneath, with secret chains,
Clung to the keel, the swiftest ship detains.
The seamen run confused, no labour's spared,
Let fly the sheets, and hoist the topmost yard.
But, though the canvass bellies with the blast,
And boisterous winds bend down the cracking mast,
The bark stands firmly rooted in the sea,
And will, unmoved, nor winds nor wave obey.
Appall'd the sailors stare, through mere surprise,
Believe they dream, and rub their waking eyes.

JONES'S *Oppian*.

THIS extraordinary fish is furnished with a most peculiar apparatus, on the crown of its head, by which it is enabled at will to fix itself firmly to any other body. For what purpose this uncommon arrangement of parts has been bestowed on it, we have no certain means of judging; for the wonders of the deep are but partially unfolded to our view, and the deep recesses of its caves, the feeding-grounds of fish, are completely out of our reach. We may, however, by observing the peculiar formation of the Remora, make some reasonable conjecture at the intention of Providence in thus departing from its ordinary course.

It is supposed, that at times it fixes itself to the moving bodies, such as ships, or larger fish, on which it

is frequently found, for the purpose of rest, or to help it more rapidly onward in its course. It may also feed, in one instance, on substances thrown overboard by the sailors; and in the other, on such portions of food as its larger companion rejects or lets slip. In addition to this, the power of attaching itself to rocks or other fixed bodies at the bottom of the sea, while waiting for the passing by of any small object on which it can prey, will, no doubt, at times, be of great advantage to its possessor.

It is said, with how much truth is doubtful, that the Indians of Jamaica and Cuba formerly used the Sucking-fish in the catching of others, somewhat in the same manner as Hawks are employed by a falconer in seizing birds. They kept them for the purpose, and had them regularly fed. The owner, on a calm morning, would carry one of them out to sea, secured to his canoe by a small but strong line, many fathoms in length; and the moment the creature saw a fish in the water, though at a great distance, it would dart away with the swiftness of an arrow, and soon fasten upon it. The Indian, in the mean time, loosened and let go the line, which was provided with a buoy that kept on the surface of the sea, and marked the course the Sucking-fish had taken; and he pursued it in his canoe, until he perceived his game to be nearly exhausted and run down. He then, taking up the buoy, gradually drew the line towards the shore, the Sucking-fish still adhering with so inflexible a tenacity to his prey, as not easily to be removed.

A foolish idea prevailed, in former times, that when this fish attached itself in great numbers to the bottoms of vessels, it impeded, or even stopped them in their

course, and many fabulous tales have been told to that effect. Of this the lines at the head of this article are an example. If no other object has been gained, by the study of natural history, than the removal of such simple prejudices, which would seem to imply that one part of the creation was made for the useless destruction of another, still that study would be a useful object of cultivation.

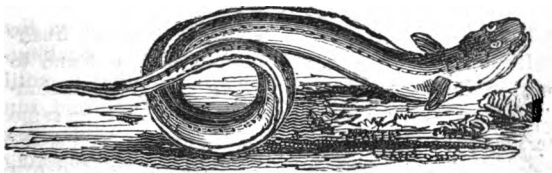
SOFT-FINNED FISHES WANTING VENTRAL FINS.

(Order, MALACOPTERYGII APODES.)

THE fishes of this order are termed *Apodes* or footless, from wanting the ventral fins which have been, not inaptly, termed the feet of the creature; they are all of them lengthened in form, resembling the common Eel.

THE CONGER EEL, (*Murona conger*.)

THE different species of Eels found in England are said to be four in number; the Conger, figured here,



THE CONGER EEL.

which inhabits the salt water, and three species which are found in fresh waters; namely, the sharp-nosed silver Eel, the broad-nosed Eel, and a species found in Hampshire, called the Snig.

The habits of the common Eel, with which our rivers and ponds are so profusely filled, have been the subject of much discussion, and an erroneous idea was prevalent, that unlike most other fishes, the Eel produced its young alive, and not from roe.

The observations of Mr. Yarrell, which have lately appeared in the second series of Jesse's *Gleanings of Natural History*, evidently prove the Eel differs in no respect from the rest of its class in its mode of producing its young: speaking of this subject, he says,—

“The enormous number of young known to be produced by eels is one of the best negative proofs that they are oviparous; viviparous fishes producing, on the contrary, but few young at a time, and these being of considerable size when first excluded.

“Since the commencement of my observations on this subject, I have had several opportunities of examining large Conger Eels, the roes of which, towards the latter part of the year, are so conspicuous as to leave no doubt of the oviparous nature of that species of sea-eel; and although analogy is not always a safe guide in Natural History, it is difficult to suppose that in two fishes so nearly allied as the Conger and fresh-water Eels, any decided difference would be found to exist in the mode of producing their young. Examination of fresh-water Eels of considerable size, at the same period of the year, confirmed this opinion; both sexes were obtained, the females most numerous, the ova distinctly visible in some instances to the unassisted eye, and with the additional power obtained by a lens every successive examination afforded new proof that our fresh-water Eels were also in their nature truly oviparous.”

The intestines of the Eel being infested by a small worm, is, perhaps, one cause of the false notion respecting their young, these worms being taken for young Eels.

Mr. Jesse also says:—

“In order to corroborate as much as possible the fact of Eels being oviparous, I will mention the following circumstance. A respectable gardener, and also an old angler, in this neighbourhood, of the name of Sylvester, lately informed me, that as he heard I had been making inquiries respecting Eels, he had called to tell me all he knew respecting them. He told me, that fishing one day in the month of March, he caught an Eel, about three quarters of a pound in weight, whose stomach was so much distended that he thought it must have swallowed a roach or gudgeon. On returning home he opened it, and found it full of roe. On asking him to mention the position and size of the roe, he described it as about the length and almost the size of his finger, running down to the vent on each side of the back-bone of the fish; and on describing the fringes to him, which I find our Thames fishermen call the *fat* of Eels, he immediately said that the roe was only an enlargement of them.”

Many of the fishes we have already described leave the salt-water and ascend rivers, for the purpose of depositing their spawn. The Eel, on the contrary, would seem to descend from the higher parts of the river, and to seek brackish water for that purpose. The young Eels, as soon as hatched, direct their course up the stream towards the fresh water, and this in such immense numbers, and with such extreme perseverance, as to obtain for this annual migration the name of

Eel fair, or more correctly *fare*, from the Saxon word *fahren*, which means *to travel*.

"A curious instance of the means which young Eels will have recourse to, in order to perform their migrations, is annually proved in the neighbourhood of Bristol. Near that city there is a large pond, immediately adjoining which is a stream. On the bank between these two waters a large tree grows, the branches of which hang into the pond. By means of these branches, the young Eels ascend into the tree, and from thence let themselves drop into the stream below, thus migrating to far distant waters, where they increase in size, and become useful and beneficial to man. A friend of mine who was a casual witness of this circumstance, informed me that the tree appeared to be quite alive with these little animals. The rapid and unsteady motion of the boughs, did not appear to impede their progress."

Their numbers may be inferred from the following account:—

"The Eel fair of the year 1832 was particularly abundant, and my kind and intelligent friend, Dr. William Roots, who resides on the banks of the Thames at Kingston, has sent me the following notes of observations, which he made at my request, on the appearance and passage of the young Eels. These Eels are generally about three inches in length, and in order to give some idea of their prodigious numbers, Dr. Roots calculated that eighteen hundred of them passed in the course of a minute when they were at their thickest. Another person whom I employed to make the calculation, informed me that by counting them, while they

passed a particular object in the river, he thought there were about sixteen hundred which made their way at the same minute. When one considers the length of time which the column of Eels takes in passing, some idea may be formed of their prodigious numbers."

Eels are extremely tenacious of life, and will exist for a long time out of their native element:—

"A fisherman of the name of Brown, who resides at Kingston on Thames, told me that one evening he brought into his small garden, which was walled round, a pot containing Eels. On visiting it the next morning all the Eels were gone, and he concluded that they had been stolen. At least a month afterwards, however, he found the Eels hidden amongst the turf in a small grass-plot in his garden, all perfectly healthy and in good condition. This was in the autumn, when there was much dew on the grass. The Eels had probably fed on earth worms."

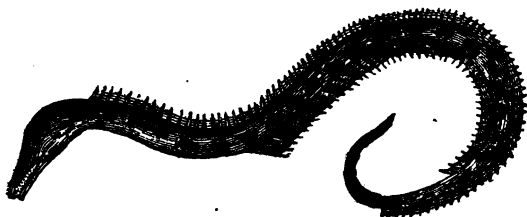
THE SEA SERPENT, (*Muraena serpens*,)

VERY nearly resembles the Eel in form, but differs as far as regards the dorsal and anal fins, which terminate before they reach the tail; the tail itself also ends in a point, and is destitute of a fin. The species figured in the next page, is a native of the Mediterranean, where it is found of the length of five or six feet, and of the thickness of the arm.

It is to be understood that this fish is not the creature of whom so many wonderful tales have been told, especially by the Norwegians and Americans. This animal, (if it exists at all) would appear to be of a most enormous size; but although many wonderful and apparently

authentic accounts have been given of it by eye-witnesses, there is every reason to believe, that the appearance of some giant inhabitant of the deep, probably a Whale, deceived the observers. We have extracted the following account of this marvellous creature from Sir A. De Capel Brooke's work, without, however, wishing our readers to take it for granted that the observer was not deceived by appearances:—

“It made its appearance for the first time in the month of July 1819, off Otersun, near the Northern Cape. During the whole of that month the weather was excessively sultry and calm, and the serpent was seen every day nearly in the same part of the sound. It continued there while the warm weather lasted, lying motionless, and as if dozing in the sunbeams.



THE SEA SERPENT.

The number of persons living on the island, he said, was about thirty, the whole of whom, from motives of curiosity, went to look at it while it remained. This was confirmed to me by subsequent inquiries among the inhabitants, who gave a similar account of it. The first time that he saw it he was in a boat, at the distance of about 200 yards. The length of it he supposes to

have been about 600 feet. Of this he could not speak accurately, but it was of very considerable length, and longer than it appeared, as it lay in large coils above the water to the height of many feet; its colour was grayish. At the distance at which he was, he could not ascertain whether it was covered with scales, but as it moved it made a loud crackling noise which he distinctly heard. Its head was shaped like that of a Serpent, but he could not tell whether it had teeth or not."

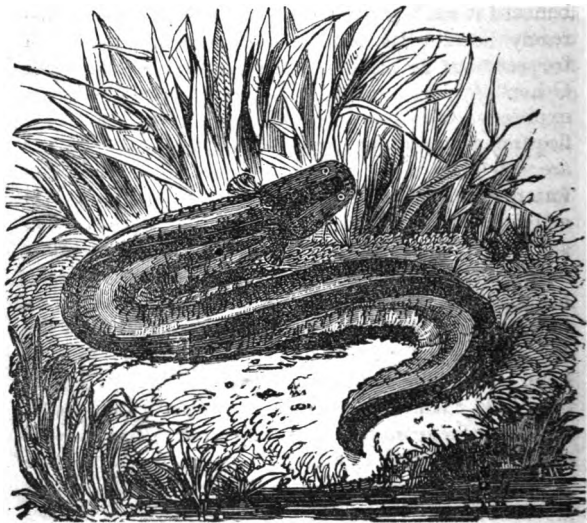
THE ELECTRIC EEL, (*Gymnotus electricus*.)

THE most singular property possessed by this fish is well described by Humboldt in his *Personal Narrative*:

"The Gymnoti, or Electrical Eels, which resemble large water serpents, inhabit several streams of South America, and abound also in the Oroonoko, the Amazon, and the Meta, but the strength of the current, and the depth of the water in these large rivers, prevent their being caught by the Indians. They see these fish less frequently than they feel electric shocks from them, when swimming or bathing in the river. To catch the Gymnoti with nets is very difficult, on account of the extreme agility of the fish, which bury themselves in the mud like serpents. Roots are sometimes thrown into the water to intoxicate or benumb these animals, but we would not employ these means, as they would have enfeebled the Gymnoti: the Indians, therefore, told us, that they would 'fish with horses.' We found it difficult to form an idea of this extraordinary manner of fishing; but we soon saw our guides return from the savannah, which they had been scouring for wild horses

and mules. They brought about thirty with them, which they forced to enter the pool.

"The extraordinary noise caused by the horse's hoofs, makes the fish issue from the mud, and excites them to combat; they swim on the surface of the water, and



THE GYMNOTUS.

crowd under the bellies of the horses and mules. A contest between animals of so different an organization, furnishes a very striking spectacle. The Indians, provided with harpoons and long slender reeds, surround the pool closely; and some climb upon the trees, the branches of which extend horizontally over the surface

of the water. By their wild cries, and the length of their reeds, they prevent the horses from running away, and reaching the bank of the pool. The Eels, stunned by the noise, defend themselves by the repeated discharge of their electric power, and during a long time they seem to prove victorious. Several horses sink beneath the violence of the invisible strokes, which they receive from all sides, and stunned by the force and frequency of the shocks, disappear under the water. Others, panting, with mane erect, and haggard eyes, expressing anguish, raise themselves, and endeavour to flee from the storm by which they are overtaken. These are driven back by the Indians into the middle of the water; but a small number succeed in eluding the active vigilance of the fishermen. These regain the shore, stumbling at every step, and stretch themselves on the sand, exhausted with fatigue, and their limbs benumbed by the electric shocks of the Gymnoti. In less than five minutes two horses were drowned. The Eel being five feet long, and pressing itself against the belly of the horses, makes a discharge along the whole extent of its electric organ. The horses are probably only stunned, not killed, but they are drowned from the impossibility of rising, amid the prolonged struggles between the other horses and the Eels.

“We had little doubt, that the fishing would terminate by killing, successively, all the animals engaged; but, by degrees, the impetuosity of this unequal contest diminished, and the wearied Gymnoti dispersed. The mules and horses appeared less frightened; their manes no longer bristled, and their eyes expressed less dread. The Gymnoti, which require a long rest and abundant nourishment to repair what they have lost of galvanic force,

approach timidly the edge of the marsh, where they are taken by means of small harpoons, fastened to long cords.

"The *Gymnotus* is the largest of electrical fishes; I measured some that were from five to five feet three inches long, and the Indians assert that they have seen still longer. We found that a fish of three feet ten inches long weighed twelve pounds; the transverse diameter of the body was three inches five lines. The *Gymnoti* of Cano de Berra are of a fine olive-green; the under part of the head is yellow, mingled with red. Along the back are two rows of small yellow spots, from which exudes a slimy matter that spreads over the skin of the animal, and which, as Volta has proved, conducts electricity twenty or thirty times better than pure water. It is, in general, somewhat remarkable, that no electrical fish yet discovered in the different parts of the world, is covered with scales.

"The *Gymnoti*, which are objects of the most lively interest to the philosopher of Europe, are dreaded and detested by the natives. Their flesh furnishes pretty good food, but the electric organ fills the greater part of the body, and this being slimy and disagreeable to the taste, is carefully separated from the rest. The presence of the *Gymnoti* is also considered as the principal cause of the want of fish in the ponds and pools of the Llanos, where they kill many more fish than they devour. The Indians told us, that when they take young Alligators and *Gymnoti* at the same time in very strong nets, the latter never display the slightest trace of a wound, because they disable the young Alligators before they are attacked by them. All the inhabitants of the waters dread the *Gymnoti*; Lizards, Tortoises, and Frogs, seek the pools, where they are secure from

their action. It became necessary to change the direction of a road near Uritucu, because these Electrical Eels were so numerous in one river, that they every year killed a great number of mules of burden as they forded the river.

"It would be temerity to expose ourselves to the first shocks of a very large and strongly irritated *Gymnotus*. If by chance you receive a stroke before the fish is wounded, or wearied by a long pursuit, the pain and numbness are so violent, that it is impossible to describe the nature of the feeling they excite. I do not remember having ever received from the discharge of an electrical machine, a more dreadful shock than that which I experienced by imprudently placing both my feet on a *Gymnotus* just taken out of the water. I was affected the rest of the day with a violent pain in the knees, and in almost every joint."

FISHES WITH TUFTED GILLS.

(Order, LOPHOBRANCHII.)

ALL the fish which we have as yet described (says Cuvier,) not only have a bony or fibrous skeleton, with perfect and moveable jaws, but their gills are always in the form of laminae, or like the teeth of a comb.

The order of the LOPHOBRANCHII, which is the fifth of the fishes, has also jaws perfect and free, but the fish belonging to it are easily distinguishable by their gills, which, instead of being formed as usual, like the teeth of a comb, are divided into little round tufts, placed in pairs along the arched bones of the

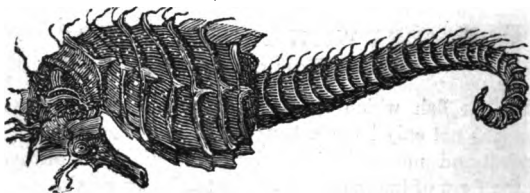
gills, a peculiarity of structure which is not observable in any other description of fish. These, gills are completely enclosed by a large gill-covering, which is fastened down on all sides by a strong membrane, leaving only a small hole for the passage of the water. They are generally very small, and destitute of flesh.

THE SEA-HORSE TRIBE.

THESE curiously formed fish have obtained this name from their resemblance, when they have been dried, to the outline of a horse's-head in miniature.

THE SEA-HORSE, (*Hippocampus*.)

THE specimen here figured is represented in a dried state, and from its singular appearance it is frequently found in the cabinets of the curious. It is taken in almost every quarter of the globe, and is generally from six inches to a foot in length: in colour it varies much,



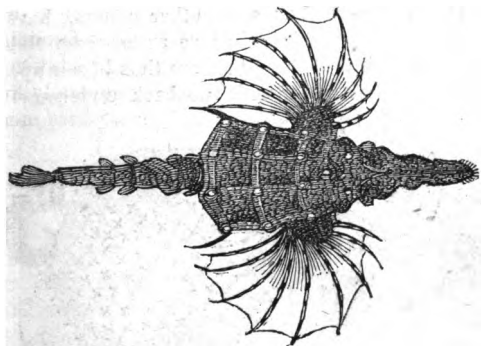
THE SEA HORSE.

according to the climate in which it is taken, being sometimes of a bluish lead-colour, at others, brown, or a greenish black: instead of being covered with scales, its whole body is enclosed in a series of hard rings, covered with numerous spines and hairs.

The ancients, attracted, perhaps, by its singular form, attributed many wonderful properties to it, which, with greater or less absurdity, have been related by most of their authors. At the present day, in Dalmatia, it is supposed to possess several healing properties, while on the other hand, the Norwegians consider it a poison.

THE SEA DRAGON, (*Pegasus draco*.)

THIS fish differs from the last described by having the mouth in the under part of the head, instead of at the extremity; this mouth also has some trifling resemblance to that of the Sturgeon, but it is composed of the same bones as that of fish in general. The



THE PEGASUS.

covering of the body is the same as that of the Sea Horse; its name arises from the extreme size of the two ventral fins which look like wings. The species we are describing is found in the Indian seas.

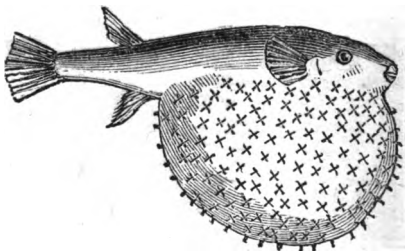
OF FISHES WITH FIXED JAWS.

(Order, PLECTOGNATHI.)

THE fish of this order, as their name (derived from two Greek words, meaning *a knitting together* and *a jaw*,) implies, have very little power of motion in their jaws, many of the bones of which are, as it were, soldered together; the gill-covering is also fastened down, as in the last order, and they have no true ventral fins.

THE DIODON TRIBE.THE SPINOUS GLOBE-FISH, (*Diodon atinga*.)

THE Diodons, as well as some other genera, have the power of inflating their bodies so as to cause them to resemble a globe. When they are thus blown up, they turn over in the water with the back undermost, and



THE SPINOUS GLOBE-FISH.

float on the surface without the power of guiding themselves. It is, however, one of their means of defence, as the spines with which the body is covered are at this

time elevated on all sides, and render the endeavour to seize them rather a dangerous experiment.

The whole of this tribe are natives of the seas of hot climates. The air with which the body of the Globe-fish is filled when captured, produces rather a loud sound as it escapes; and this, taken in connexion with the situation of their kidneys, which being placed very high, that is near the head, were mistaken for lungs, gave rise to an idea that their mode of breathing was unlike that of any other fish.

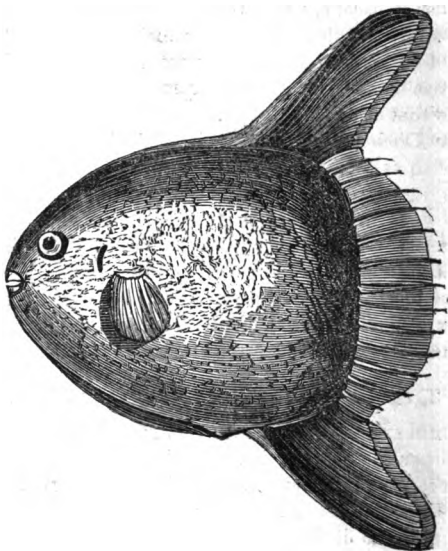
The Diodon is taken, it is said, by using a small shell-fish as a bait. At first it approaches with caution, tastes it, retreats, comes back again, and at last swallows it: as soon as it is hooked, it puffs itself up like a balloon, and struggles violently. Finding its efforts useless, it allows the air to escape from the body, and becomes as flaccid as a kid glove. As soon, however, as it is nearly out of the water, it becomes again active, and makes fresh efforts to escape.

THE SUN FISH, (*Orthogoriscus mola*,)

RESEMBLES the Diodons in its fixed jaws, but wants the power of inflating itself; it is found in the Mediterranean, and in many parts of the ocean. Its name of Sun Fish, or Moon Fish (for it possesses both,) has been given to it from its almost circular form, and on account of the brilliant silvery hue of its sides, which is sometimes much increased during the night by the phosphorescent property of the oil with which its body is impregnated.

At first sight it appears more like the head of an animal than a perfect fish; its body forms a kind of oval; it has no scales, but a thick and hard skin. The

flesh is extremely soft, and the bones little more cartilage. Great difference of opinion exists as to the value of this fish as an article of food, some declaring it to be so bad as to be thrown overboard by the fishermen when taken, after they have cut off its large fins;



THE SUN FISH.

while another informant says, "The fish are found in the German ocean at the entrance to the Baltic, and according to the report of the fishermen, they are fat, the flesh excellent, and quite fit for food. It swims very slowly, and is said to be so timid, that at the ap-

proach of a ship, or any floating body, it precipitates itself to the bottom, like a stone.

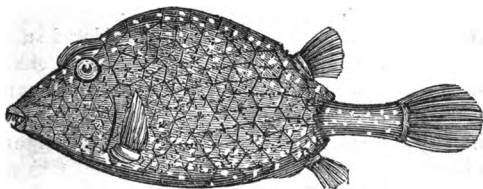
This fish is taken in the summer by means of a harpoon, but it is necessary to strike with considerable force, on account of the thickness of its skin and the presence of a layer of fat immediately under it, as it is requisite that the flesh itself should be pierced to prevent the escape of the fish.

The Sun Fish is frequently taken as much as four or five feet in length, and weighing upwards of three hundred pounds.

THE TRUNK-FISH TRIBE.

THE TRUNK-FISH, (*Ostracion triqueter*.)

THE Trunk-Fish is so called from the hard and solid case in which its body is enveloped, and which looks more like a packing-case containing the fish than a part of the creature itself. Instead of scales it is covered with



THE TRUNK FISH.

regularly-shaped bony plates, soldered as it were into an inflexible buckler which envelops the whole body, but allows the tail, the fins, the mouth, and an appendage like a lip, which decorates the edges of the gill-opening, to pass through by so many distinct holes.

The shell of the Trunk-fish is most beautifully and regularly marked over its whole surface, as if it had been carved by an expert workman. These fish are never found in the seas of Europe or of the north; they are only met with in the torrid zones, frequenting the shallow water near the coast. They have but little flesh on their body, but their liver is extremely large and yields a great quantity of oil.

GRISTLY-FINNED FISHES.

THE second series or division of the fishes contains all those whose skeleton is cartilaginous, that is of a substance like gristle. The bones in the species we have been last describing, have become gradually less and less firm in their texture, and more nearly resembling those of the present division, rendering the point of separation of the two divisions somewhat difficult to determine.

This group of fish can neither be considered superior or inferior to ordinary fishes; for although the skeleton is less perfectly formed, yet in some cases the apparatus of the ear very nearly approaches that of the reptiles, while at the same time, in other species, the organization is so extremely simple, and the skeleton so slight and imperfect, as almost to cause one to hesitate in placing them among vertebral animals.

The cartilaginous fishes have been formed into two orders, as already noticed, namely those with free gills, and those with confined gills.

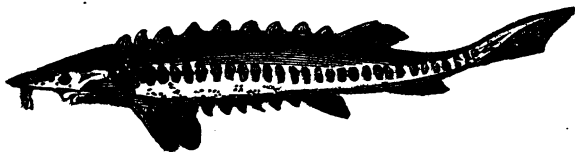
GRISTLY-FINNED FISHES WITH FREE GILLS. (Order, CHONDROPTERYGII.)

THE STURGEON TRIBE.

THE Sturgeons resemble the Sharks in form and in the situation of the mouth; but as far as regards their habits, they have no affinity whatever with these voracious inhabitants of the deep. Their body is curiously covered with rows of small round bony shields, of a somewhat conical form: all the species, which are not very numerous, frequent fresh water, and become a source of great profit to mankind.

THE GREAT STURGEON, (*Acipenser huso*.)

THE species figured is the largest of the Sturgeon tribe; it is not uncommonly taken as much as twenty-five feet in length, and has been occasionally seen of a much larger size. The Great Sturgeon is not so generally distributed as the Common Sturgeon, being seldom taken, except in the rivers that fall into the Caspian Sea, particularly the Wolga. In these rivers it furnishes



THE GREAT STURGEON.

the means of existence to a vast number of people; the flesh is prepared in various ways for food, being salted, dried, and marinated, that is pickled with vinegar and

sweet herbs; it is also eaten fresh near the places where it is taken: it affords a useful oil, and produces the greatest portion, and the finest description, of that valuable article, isinglass; and its roe is made into a substance called *caviare*.

In the Wolga and the Jaick, when the time arrives for the return of the Sturgeons to the upper part of the rivers, a dyke is constructed in different parts of the stream, composed of stones placed sufficiently close to prevent the passage of the fish. The centre of this dyke forms an angle opposed to the current; the fish in ascending the river, unable to pass through the dyke, advance towards the angle: at that place an opening conducts them into a kind of chamber, formed either of nets or osier wands; above this opening there is a sort of scaffold, on which the fishermen establish themselves. As soon as a Sturgeon has entered this chamber, the fishermen placed on the scaffold, let down a kind of door to prevent the return of the fish; they then open the extremity of their trap, to allow the Sturgeon to leave it, and soon make good their capture. During the day they are warned of the entrance of a Sturgeon by the motion it communicates to some cords attached to small floating bodies; but during the night the fish, by running against another series of cords, causes the door to fall that prevents its return, at the same time a small bell announces to the sentinel the entrance of his prey.

In the month of January, the Cossacks, on the River Jaick, capture the Sturgeons by means of a sharp steel hook at the end of a pole. It is a common belief among these people, that in the autumn the fish place themselves in ranks in the deepest parts of the river, and

remain there in a half-torpid state till the return of spring. As the bed of the river Jaick is a moving sand, the deepest parts vary every year, so that it is difficult to discover the retreats they have chosen. The most experienced of the fishermen, watch during the autumn, the movements of the Sturgeons] with great assiduity, especially just before the river is frozen over. At this time they say the fish, when they have chosen a retreat, leap about on the surface of the water, over the spots they have selected for their winter dwelling. Another set of observers choose a place on the ice, free from snow, lay themselves down upon it, and rolling up their head in a cloth, endeavour to hear what is going on at the bottom of the water.

As soon as the time of the fishery has arrived, that is about the 3rd or 4th of January, the people assemble with many ceremonies, and after receiving the reports of those Cossacks who have been on the look-out for the spots where the fish are in the greatest numbers, they fix upon a day for the commencement of their operations.

For the purpose of maintaining order, one of their number is appointed chief. They then separate into groups of five or six, or more, and get ready the necessary implements. The most necessary are good steel hooks, well sharpened, and poles of different sizes, which, if necessary, they can join to each other like a fishing rod: these poles have also a piece of iron, of five or six pounds weight, attached to them, to prevent their being carried away by the current.

Each man has, in addition, a shorter crooked stick, to draw the fish upon the ice after it is taken, and also a mallet or a short axe to deprive it of life.

The day on which the fishery commences, all the

Cossacks assemble with their sledges in the appointed place in the town, before daylight, and range themselves in a line as fast as they arrive. The chief of the fishery then passes along their ranks to see that they are all properly armed in case of attack. As soon as day appears, the signal for their departure is given by the discharge of two cannons. The whole then set off at a gallop for the appointed place, for the purpose of getting possession of the most advantageous situations. In the mean time, however, no one is allowed to begin the fishery till the ice has been broken, every man in his place, and a signal given by the order of the chief, of a discharge of musketry. The river is divided into two parts, one portion being reserved for the Spring and Autumn fisheries, and the other for the Winter. This last part is separated into a great number of stations. At first the fishery is confined to the day, to give time to the poorer sort to purchase, in the evening, fodder for their horses, or any other article of which they are in need, with the produce of this first fishing. The great fishery commences five or six days afterwards, and generally lasts about nine days. Each day the extent of the fishing-station is marked out. A third fishing is afterwards made, but this seldom lasts more than one day, and the produce is intended to be carried home for the consumption of the men and their families.

Each fisherman makes a moderately-sized round hole in the ice at the spot he intends to fish, and keeps his hook in such a position as to have the point always opposed to the stream, and not above a hand-breadth from the bottom. As soon as a large fish strikes against the hook, it causes it to sink; the Cossack then suddenly jerks it up and lands the Sturgeon on the ice with the

assistance of his short-hooked pole. In this manner, they sometimes take as many as eight or ten large Sturgeons in a day.

The fishermen of Astrachan employ for the same purpose a net or bag about twelve feet in length, and six in breadth. When the winter has fairly set in, an order is issued to prevent all kind of fishing in those spots where it is supposed the large Sturgeons are, and to prohibit all boatmen from making any noise or discharging any kind of fire-arms. After this, the men retire to a distance, and place sentinels to prevent the fish being disturbed. A day is now fixed on for the fishery, which generally takes place at the beginning of November, when it is observed the fish more frequently rise to the surface. All parties being provided with their tackle, the director of the fishery gives a great entertainment to the principal men of the town. The next morning he proceeds, followed by his friends and one half the fishers, to one part of the river, while the other half is despatched accompanied by his deputies to another. The most profound silence is ordered. The nets being prepared, a musket is discharged as a signal for the departure of nearly three hundred boats; the nets are cast, and the whole party scream and shout in the most violent manner. The fishes, alarmed, endeavour to escape, but many fall into the nets. The fishery generally lasts about three hours, and is not attempted again till after the lapse of some days.

The isinglass, of which we have already spoken, is chiefly prepared on the borders of the Caspian Sea, and forms a most valuable article of export on the part of the Russians. The different methods employed in this part of Russia, and particularly at Astrachan, to make

the Isinglass, consist in plunging the air-bladders of the Sturgeons in water, separating carefully the outer skin, and washing them free from blood; after this, they are rolled up in a cloth, and kneaded with the hands till they become softened. They are then moulded into the form of imperfect cylinders, and hung up to dry in a gentle heat, and finally, they are bleached, with the fumes of brimstone.

Another method of preparing isinglass is employed by the Ostiaks, which causes it to dissolve more easily; it consists in separating the impurities by means of boiling water. It is a curious fact, that although different species of Sturgeons are found in most parts of the world, no attempt appears to have been made to prepare this useful article in any quantity, except in Russia.

It is said that the Russians extract a kind of isinglass also from the fins and tail of this fish, and there is no doubt that [a description of fish-glue, nearly, if not quite equal to it, might be prepared from the swim-bladder and fins of many other fish. Isinglass is employed for many purposes both in the arts and in cookery; it forms an excellent cement, and is used to clarify wine, beer, coffee, &c. A thin substance like Gold-beater's skin, and used for the same purpose, is also made from this useful article.

The roes of the Sturgeon are formed into a substance called *caviare*, which is prepared by salting and seasoning them, and afterwards rolling them up in the form of large balls, and preserving them in vessels of oil. This method was employed formerly in France, but as a French author remarks, "they learnt this art of the Greeks, for they are not more fond of oil in Spain, of

wine in Germany, or of beer in Flanders, than they are of caviare in Greece." In some places the skin is made into a kind of leather, and the fat is used on the borders of the Caspian instead of butter.

The flesh of the Sturgeon is unlike that of most other fish, that on the back being said to resemble veal, and that on the belly, pork.

Although not universally admired, the flesh of the Sturgeon is considered delicate and well flavoured when in a fresh state, but as it is a very large fish, and taken in great quantities, it is necessarily salted for the purpose of preserving it. Du Hamel, in his treatise of fisheries, describes this process as follows. "The men employed in the curing of the Sturgeon, remove the tongue, the breast, the tail, the solid flesh, and the entrails.

"The flesh is cut into *junks* and covered with salt; when the salt has penetrated, these pieces are placed in barrels in a very strong brine. The tongues, after they are salted, are exposed to the sun or placed near a stove in a moderate degree of heat, for the purpose of being dried. As to the breasts and tails, they are placed in casks, and subjected to heavy pressure for the purpose of expressing the oil; after having been left in this condition for four or five days, they are salted in the same manner as the other parts.

"A great part of the salted flesh of these fish is exported from the port of Archangel. We have already noticed their mode of extracting the oil from the flesh; but in addition to this, the entrails are collected together and placed in earthen pots, over a slow fire, and when nearly cold a very good oil is poured off. But the *marinated* Sturgeon is considered the best; for this

purpose, the flesh is cut in slices, and placed in a pan in brine sufficiently strong to cause the fish to float. It is then boiled for two hours without intermission, the slices are then taken out and placed on hurdles, to allow the brine to drain off and the fish to become nearly dry ; after this, it is placed in casks, or what is better, in earthen jars, and being seasoned with different kinds of spice, the vessels are filled with the very best sweet oil.

In Russia, the Sturgeon obtains different names according to its size ; thus for instance, when it is from two feet to two feet eight inches in length, it is called *sapkowaja* ; from three feet to three feet four inches, *polumernaja* ; if four feet, *mernaja* ; from four feet four inches to four feet eight inches, *gorbuscha* ; if five feet, *polumateraja*, and if beyond that, *materaja*.

THE CHIMÆRA, (*Chimæra monstrosa*.)

THE Chimæra approaches very nearly in form to the Shark tribe, but is far from being so ravenous in its disposition ; it is found in the Arctic, and in some of the European seas, and attains the length of two or three feet. Being often taken in the company of the Herrings, while performing their migration, it has gained the common name of King of the Herrings.

The mouth of this odd-looking creature is furnished with hard and undivided plates instead of teeth, four of which are placed in the upper jaw and two in the lower.

GRISTLY-FINNED FISHES WITH FIXED GILLS.

(Order, CHONDROPTERYGII.)

In this division of the GRISTLY-FINNED FISH, the gills are deprived of all freedom of motion by being fixed by their outer fringes to the skin of the creature, the water

having access to these organs of breathing through several small openings on each side close to the pectoral fin.

THE SHARK TRIBE.

Increasing still the terrors of the storm
His jaws horrific, armed with three-fold fate,
Here dwells the direful Shark, lured by the scent
Of reeking crowds, of rank disease and death.
Behold! he rushing, cuts the briny flood,
Swift as the gale can bear the ship along;
And from the partners of that cruel trade,
Which spoils unhappy Guinea of her sons,
Demands his share of prey,—demands themselves.
The stormy fates descend, one death involves
Tyrants and slaves; when straight, their mangled limbs
Crushing at once, he dyes the purple seas
With gore, and riots in the vengeful meal.

Of all the inhabitants of the sea, there are none more dreaded than these voracious fish. Endowed at the same time with great strength and wonderful powers of motion, these fierce creatures perform the same part in the economy of the deep, as Tigers and other beasts of prey do on land.

A most curious contrivance is noticeable in the formation of the intestines of these huge animals, for the purpose of enabling them the more readily to digest their food. The stomach of the Shark, in proportion to the size of the fish, is far from being large, but the interior of this organ is partly occupied with a number of spiral folds. The use of these folds is to offer a greater extent of surface to the food, so as to impede its

progress, and allow time for the absorption of all its nutritious particles. The only part of the organization of the Shark which *seems* not adapted to assist the fish in securing its prey, is the position of the mouth, which being placed on the underside of the head, obliges its possessor to turn half round when endeavouring to catch any falling body, but it is more than probable that the chief portion of the food of the Shark is obtained from the bottom of the sea, and in that case the position of the mouth is of service.

Whatever may be said respecting the situation of the mouth, nothing can be more dreadfully perfect or better adapted to secure its victims than the arrangement of the teeth, both in the upper and lower jaw: in some species, there are frequently as many as six rows above, and the same number below, hard, sharp, and pointed, and in many instances as much as two inches in length.

THE REQUIN, OR WHITE SHARK, (*Squalus Charcharias.*)

THIS species is by far the most formidable of the whole of its tribe, and is found in abundanc in all the seas of warm climates, and sparingly on the European coasts. It is the terror of all whose business obliges them to enter the water near the shore, or at the mouths of large rivers. The length of this creature is frequently from 20 to 30 feet, and the form, as may be seen by the engraving, is long, and well adapted for the purpose of rapid motion. Its organs of smell are extremely acute, enabling it to discover its prey at a considerable distance, even during the night.

The enormous size of the gullet of this fish renders it capable of swallowing animals of considerable size, and

a large Shark will not make many mouthfuls of a human being. It is said, that at times a whole carcass has been found in its stomach without one of its members being separated.

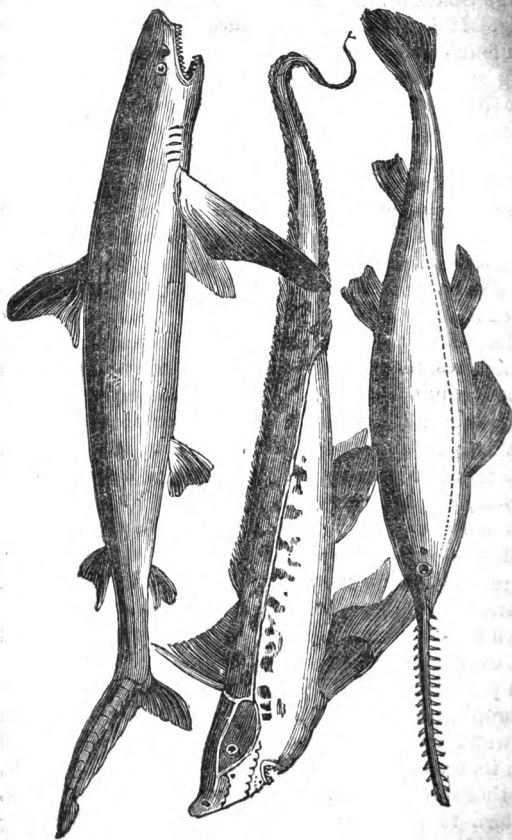
So little are these creatures alarmed when pressed by hunger, that during a sea-fight in 1782, a French vessel named the *Cæsar*, having taken fire, many of the sailors, endeavouring to save their lives by leaping into the sea, were devoured by a group of Sharks who swam in between the hostile squadrons, fearless of the noise of the cannon which was thundering from all quarters.

A French author gives the following fanciful derivation of the word *Requin* :—

“Let us add to these circumstances so frightful in themselves, the strength and arrangement of the teeth in the *Requin*, the rapidity of its movements, its frequent appearance in the midst of tempests, and the phosphoric light with which it then shines, and we shall have an explanation of its name, which is derived from the word *requiem*, so commonly used to describe death and endless repose.

“Terrible even when subdued and loaded with chains, struggling with violence in the midst of its bonds, still powerful even when bathed in its own blood, and able with a single blow of its tail to scatter destruction around him, even at the point of death!”

In pursuing its prey, it is so blinded by the eagerness of pursuit, that it has been known to fling itself out of the water and alight upon the beach. It feeds also upon its own species; Vancouver in his voyages relates, that those which are harpooned and not able to escape, are torn to pieces by their companions. Seals, Tunnies, and Cod, are their most usual description of food,



1.

2.

1. THE REQUIN.

2. THE CHIMERA.

3. THE SAW-FISH.

when pressed by hunger, hardly any kind of aliment refused; they then seek Cuttle-fish, and Shell-fish of all kinds. They also follow vessels for hundreds of miles, to pick up whatever may be thrown overboard; and when the horrible traffic in Negro-slaves was more common than it is at present, shoals of Sharks have been seen in the *wake* of a slave-ship, eagerly waiting for the bodies of the unfortunate creatures who had died through disease and confinement. Commerson says, he has seen the Sharks leap out of the water to seize a corpse before it was lowered into the sea, to the height of nearly twenty-feet.

The young of the Shark, and also of the Ray-tribe, are produced from a species of *ovum* or egg, the shell of which is of a brown colour, and almost of a leathery consistence; this ovum is of an oblong form, something like a very flat square pincushion, with long curling tendrils projecting from each corner. In these cases, the young are hatched, and when sufficiently large to feed themselves, the end of the case opens, and the young Shark swims out to begin its career of destruction. It is at this time, about six or eight inches in length.

It is seldom that any part of the flesh of the Shark is turned to advantage, with the exception of the liver, which yields a considerable quantity of oil, and sometimes small portions of the animal are used as bait for other fish.

But the skin and the fins are of considerable service in the arts. In Norway, the skin is employed in the making of harness, in Greenland in the construction of canoes, while in Europe, the carver and worker in hard wood, uses the fins as a polishing instrument.

Among the fossil remains which are frequently dug

out of the bowels of the earth, Sharks' teeth are far from uncommon ; one of these, in which the enamelled portion was four inches and a quarter in length, is deposited in the Museum of Natural History at Paris, and the following calculation has been made of the supposed size of the animal to which it belonged. Supposing the fish to be two hundred times the length of its tooth, its owner must have been upwards of seventy feet in length ; if then we calculate the size of its throat according to our observations of other species, we shall see that the arch of its upper jaw ought to have been at least thirteen feet in length ; and as the soft parts with which the two jaws are united, are capable of great extension, we may say, that the total circumference of the opening of the mouth was, at least, twenty-six feet, and the medium diameter nearly nine feet.

“What a devouring abyss ! what size, what weapons, what power does not this giant Shark present to our imagination, while pursuing its ravaging course through the ocean ! Was this at a time when the sea covered the whole of Europe, and bathed the summits of the lofty Pyrenees ? That this tooth belonged to one of the family of the Sharks, there can be no doubt, and a practised eye will see that it was a species very nearly resembling the Requin, if not identical. But although we meet with no instances of Sharks of this size at present, is it not possible that in those parts of the ocean which lay out of the track of commerce, and from which the severity of the climate, or the violence of tempests have driven navigators, creatures resembling it may be found, who in those secluded places, having enjoyed such perfect tranquillity, or more properly, such great impunity, that those who thousands of years since

infested the margins of the Pyrenees, may have lived there sufficiently long to have attained the size we have mentioned?"

We shall conclude this account of the Requin, with several anecdotes illustrating the habits of these monsters of the deep. The following is extracted from a splendid work, called the *Oriental Annual*.

"Though Sharks are seldom found in the surf, they are very numerous beyond it; but they sometimes do venture within the swell, in the expectation, probably, of picking up a meal from an overturned Massoolah boat.

"One morning a little boy, about eight years old, happened to be washed from a catamaran which was managed by his father, who was thus early initiating him into the hardships of that mode of life which he intended him to pursue, and, before he could be rescued from the turbulent waters, a Shark drew him under, and he was seen no more. The father lost not a moment, but calmly rose, and placing between his teeth a large knife which he carried sheathed in his cummerbund, plunged beneath the lashing waves. He disappeared for some time, but after a while was occasionally seen to rise, and then dive under the billows, as if actively engaged with his formidable foe. It was a period of painful suspense to those who were anxiously watching the issue from the boats outside the surf. After a while the white foam was visibly tinged with blood, which was viewed with a sensation of horror by those who could only surmise what was going on under the water. The man was again seen to rise and disappear, so that the work of death was evidently not yet complete. After some further time had elapsed, to the astonishment of

all who were assembled on the beach, for by this time a considerable crowd had collected, the body of a huge Shark was seen for a few moments above the whitening spray, which it completely crimsoned, and then disappeared; an instant after, the man rose above the surf, and made for the shore. He seemed nearly exhausted, but had not a single mark upon his body, which bore no evidence whatever of the perilous conflict in which he had been so recently engaged. He had scarcely landed when an immense Shark was cast upon the beach by the billows. It was quite dead, and was immediately dragged by the assembled natives beyond the reach of the surge. It presented a most frightful spectacle, exhibiting fatal proofs of the terrific struggle which had ensued between this ravenous tyrant of the deep and the bereaved father. He had, indeed, taken a most signal revenge.

“ On the body of the huge creature were several deep gashes, from one of which the intestines protruded. The knife had been evidently plunged into the belly, and drawn downward with unerring precision, presenting an immense wound nearly a yard long. There were also several deep incisions about the gills, and below the fins; in short, it is impossible to describe the fearful evidences which the monster exhibited of the prowess and dexterity of its determined aggressor, who had so boldly perilled his life to revenge the death, as it was afterwards ascertained, of his only child. As soon as the Shark was drawn to a place of security, it was opened, when the head and limbs of the boy were taken from its stomach. The body was completely dismembered, and the head severed from it; the different parts, however, were scarcely at all mutilated. It would seem

that, after separation, they had been immediately swallowed, without being submitted to the previous process of mastication.

“The moment the father saw the truncated remains of the little object of his affection, the habitual coldness of the Hindoo merged in the tenderness of the parent, and he for the moment gave way to the agonies of his heart. He threw himself upon the sand, and mourned his bereavement—

With sad unhelpful tears;

but soon recovering his constitutional serenity, he unrolled his dripping turban, and having placed the severed remains of his child in the ragged depository, bore them to his fragile tenement of bamboo and palm-leaves, in order to prepare them for immediate cremation.

“Upon being asked to relate the particulars of his encounter with the Shark, he stated, that as soon as he had plunged into the water, which he did a few moments after the child had been dragged under by his powerful enemy, he saw the monster in the act of swallowing its victim. He instantly made towards it, and struck it with his knife upon the gills. By this time, it had completely gorged its prey, and did not at all seem disposed to enter upon the encounter to which it had been so roughly challenged. Having received a second stroke in the gills, it rose towards the surface, followed by its assailant, who kept plunging the knife into various parts of its body. The monster turned several times to seize its adversary, who, dexterously evading the intended visitation by diving under it, renewed his attack with the knife. The Shark's voracity had been so completely appeased by the meal which it had just

made, that it showed little disposition to continue the conflict, until repeated trenching from the formidable knife of its determined foe roused it to desperate resistance, when it turned again upon its back, though with less activity than these creatures are wont to do when craving for food ; but the man dived rapidly under it, and, watching his opportunity, as soon as the Shark regained its natural position, plunged the keen blade into its belly, and drew the weapon downward with all his strength, thus inflicting that mortal wound which the creature exhibited upon the strand. After this, it made a tremendous splashing for a few moments, then sank apparently lifeless to the bottom. Seeing that the strife was at an end, the man made for the shore, as already stated, and shortly after the huge carcass was cast upon the beach.

“Before we left Madras, another singular event occurred: a very spirited Horse of high breed, and greatly valued by its owner, who was about to proceed with it to the opposite coast, resisted every attempt to get it into the Massoolah boat so effectually, that there was no alternative but to tow it through the surf, by attaching it to the stern, or to leave it behind. The creature took to the water willingly, gallantly stemming the billows. Its head was kept above them by the Indian groom, who held the rope by which it was attached to the boat's stern ; but what was the man's astonishment, when they got alongside the vessel, and were about to hoist the noble animal upon deck, to find that the Sharks had literally torn out its entrails ! The agitation of the water prevented a discovery of the mischief until they came to get the horse on board.

“In order to afford some further idea of the voracity

of these creatures, I will state a circumstance which occurred to a lady during her passage from England to Bombay. She was at work in her cabin, sewing some riband upon a pair of shoes, when a sudden lurch of the ship overturned her work-table, and all that was on it was precipitated through the port into the sea. On the following day a huge Shark was caught, in the stomach of which were found her shoes, needle-book, &c., which were very little injured, considering that they had been upwards of twenty-four hours in a place so very unfavourable to their preservation."

Persons while swimming, have often been seized and mutilated by Sharks. There is a painting now in Christ's Hospital, London, illustrating an event of this nature. It represents the fate of Sir Brooke Watson, who, while swimming at a little distance from a ship, saw a Shark making towards him: struck with terror at its approach, he cried out for assistance; a rope was instantly thrown, and while the men were in the act of drawing him up the ship's side, the monster darted after him, and at a single snap tore off his leg.

The Shark is taken without much difficulty, for being extremely voracious, it greedily seizes any bait that is offered. The usual plan is to bait a very large hook with a piece of fat; this hook is attached to a strong iron chain, about two ells in length. If not pressed by hunger, it will approach the bait and turn it round with its nose with an air of disdain, as if for the purpose of examining it. It will then retire to a short distance, and return again; sometimes it will prepare to swallow the bait, and then again leave it. When the spectators have amused themselves sufficiently by noticing its behaviour, the cord is pulled, as if with the intention of

withdrawing the bait; its appetite again awakens, and fearful of losing its prey, it suddenly seizes and swallows it. Finding itself taken, it makes the most violent efforts to escape, endeavours to bite the chain in two, lashes its tail, and becomes almost furious. It will even endeavour to get rid of the hook by disgorging the contents of its stomach. When sufficiently enfeebled by its efforts, the cord is hauled in so as to raise its head a little above the water; another rope with a running noose is then thrown out over the tail, and drawn tight. It is then easily raised into the vessel.

The fat of the Shark has the property of keeping sweet for a great length of time, and becomes gradually harder, and the Icelanders it is said, use it instead of lard, eating it with their Stock-fish; it is in general, however, boiled down into oil.

The flesh of the Shark is seldom used as food, being extremely hard and tough. The Negroes, to render it tender, will hang it up for eight or ten days, till it becomes rather high, and it is then considered most exquisite eating.

THE BASKING SHARK, (*Selachus maximus*.)

THIS is the largest of the Shark tribe, having been taken as much as thirty-two feet in length. It takes its name from its practice of lying on the surface of the water, as if basking in the sun: although much larger than the last species, it is considered almost harmless, and it has been said that its only food consists of *medusæ* or sea-nettles, an animal of a jelly-like substance found in great abundance in the seas of most countries, and of seaweeds. Its principal habitation is in the northern seas of Europe, though it is occasionally found in the British

seas, particularly off the Scotch coasts. In December, 1787, one was cast on shore on the French coast at St. Cast, near St. Malo, thirty-three feet in length and twenty-four in circumference. In 1802, another specimen was captured at Boulogne-sur-mer, after a combat with a Whale which lasted thirty-six hours.

The liver is of such an immense size, as frequently to weigh nearly a thousand pounds; and the oil of a single liver has been known to fetch from twenty-five to thirty pounds sterling. The inhabitants of the northern parts of Europe, are very dexterous in killing this fish.

When pursued, the Basking-Shark does not accelerate its motion till the boat comes almost in contact with it, when the harpooner strikes his weapon into its body, as near the gills as he can. It appears not to be very susceptible of pain, for it often remains in the same place till the united strength of two men is exerted to force the harpoon deeper. As soon as it perceives itself wounded it plunges headlong to the bottom, and frequently coils the rope round its body, and attempts to disengage itself from the fatal instrument by rolling on the ground. Discovering these efforts to be in vain, it swims off with such amazing rapidity, that one instance occurred of a Basking-Shark towing to some distance a vessel of seventy tons burden, against a fresh gale: one of these fish will sometimes run off with two hundred fathoms of line, and two harpoons in its body, and will employ the men from twelve to twenty-four hours before the capture is made good.

THE DOG-FISH, (*Spinax acanthias*.)

THE Dog-Fish is a small species of Shark, very numerous in the British seas; the fishermen who take Cod

and other fish by means of hooks, have their bait frequently swallowed by these voracious creatures; and they are so frequently taken instead of the more valuable Cod, that the boys on board amuse themselves in forming rings or hoops about seven inches in diameter, with the small horny spine which grows on the back, and as these specimens of fancy work are tolerably common, and each circle contains the spoils of from forty to fifty fish, it is evident that the number taken must be considerable.

On the coast of Scarborough, where the Haddocks, Cod, and Dog-fish are in great abundance, the fishermen universally believe, that the Dog-fish make a line or semicircle to encompass a shoal of Haddocks and Cod, confining them within certain limits near the shore, and eating them as occasion requires.

Their flesh is hard and disagreeable to the taste, and strongly impregnated with the smell of musk, and the liver appears to possess a kind of poisonous quality.

A shoemaker, at a country town in France, named Gervais, partook of a portion of the liver of this species of Shark, along with his wife and two children, one of whom was fifteen years old, and the other ten. In less than half an hour the whole four were overcome with a fit of drowsiness, and threw themselves on the bed, and it was not until three days had passed, that they sufficiently recovered to be aware of their situation. They were then more or less awake, according to the greater or less quantity of liver that each had eaten. The woman, however, although she had eaten the most, was the first to recover. When she awoke from her drowsiness, her face was of a deep red colour; the day after, she experienced a most violent itching sensation,

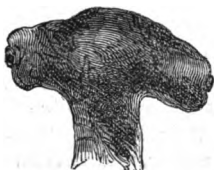
which did not leave her until the skin had completely peeled off, in large flakes, excepting from the head; and the same effects were experienced by her husband and children.

The skin of the Dog-fish and other small species of the Shark tribe, is used for covering cases of mathematical instruments, &c. Their liver also yields a considerable quantity of oil.

THE HAMMER-HEADED SHARK,

(*Zygæna malleus.*)

THIS strange creature resembles the Shark in many respects, but differs from it in the odd shape of its head, which, as may be seen by the engraving, resembles in some degree a hammer. The orbits of the eyes projecting to a great distance from each side of the skull.



HEAD OF THE HAMMER-HEADED SHARK.

This fish is very abundant in the Mediterranean, and is at times taken as much as fifteen or eighteen feet in length; it was well known to the ancients, but they believed it to be a kind of Whale. At Marseilles, it is called the *Jew-fish*; in the West Indies it has obtained the name of the *Slipper-fish*.

THE SAW-FISH, (*Pristis antiquorum.*)

THE Saw-fish has the lengthened form of the Shark, while its body is flattened near the head, and the open-

ings to the gills are placed below, as is the case with the Ray; but their distinguishing character consists in the bone which proceeds from the front of their head, flattened like a sword, and armed on each side with great teeth like a saw, or more properly a gardener's rake. It is from this, that these fish take their name, and with it they fearlessly attack the largest of the Whale tribe; the teeth with which their jaws are furnished, are very small and flattened.

The Saw-fish reaches the length of twelve or fifteen feet; and frequents nearly all the seas of both hemispheres, amid the icebergs of the Poles, and under the burning sun of the Equator; and is met with as frequently on the coasts of Africa and Bengal, as on those of Spitzbergen and North America. It is distinguished as well by its strength and daring, as by the curious weapon with which it is armed.

But although a large and powerful creature, it never reaches the size attributed to it by the ancients, some of whom describe it as being two hundred cubits, that is, three hundred feet in length. "Attacking fearlessly," says a French author, "and often having a decided advantage, in the battle with the giants of the empire of Neptune; animated with a kind of hatred against the cetaceous tribes in general, it has been seen, on the surface of the Northern Ocean, to try its strength with the Whale, and frequently to come off conqueror from a contest in which one blow from the tail of its enemy would have been sufficient to have deprived it of life. All the Northern fishermen agree in this point; all energetically describe the obstinate combat in which the Saw-fish, uniting agility with strength, bounds onward, darting above the surface of the waters, escaping the

blows which threaten him on all sides, and falling on the body of the Whale, it forces deep into its back its formidable weapon, and tinges the surrounding waves with blood. Mertens was witness of a combat of this description between a Saw-fish and a Whale called a *North-caper*; he saw them spring forward, pursue each other and rush together, with so much force, that the water was scattered on all sides and descended like rain, but stress of weather prevented his perceiving on which side victory declared herself."

Sometimes driven by the tempest against the keel of a ship, or mistaking its hull for a Whale, it has buried its saw in the wood, where, being broken, it has remained, and been discovered on the return of the vessel to dock.

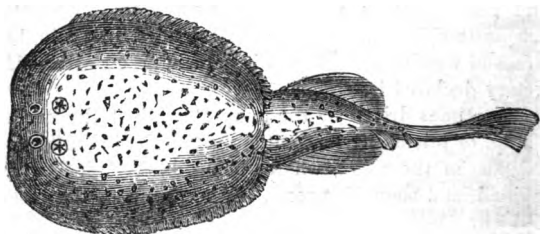
The flesh of this fish is hard, leathery, and of a bad flavour, and it is seldom eaten except in cases of great need. The Negroes on the western coast of Africa, always abstain from feeding on it, but for a very different reason; their imagination, smitten by its great size, extraordinary figure, and prodigious power, having caused them to regard it as a kind of divinity, and they preserve small pieces of its saw, and look upon these fragments as charms or amulets. When the violence of a tempest has driven one of these fish on the coast, they carefully cut off the head, and preserve it with great veneration.

THE TORPEDO, (*Torpedo galvanii.*)

THE Torpedo approaches the Ray tribe in its flattened form, but in other respects is considered more nearly allied to the Sharks; it has, therefore, been placed at the end of that tribe immediately before the Rays.

The strange power possessed by this fish is the same as that already noticed in the case of the Electric Eel. In the following account of the Torpedo, we shall describe rather more minutely this extraordinary faculty.

The Torpedo although it is taken of considerable weight, is yet in that point far behind many other



THE TORPEDO.

species of the Ray kind. It has seldom been seen more than sixty pounds in weight. It is commonly met with in the Mediterranean, and some of the European seas. Redi, a celebrated Italian physician, was the first man who endeavoured to acquire some precise idea of the nature of the power possessed by this formidable fish. The first observations made by this illustrious Italian on the Torpedo were to the following effect: He had scarcely grasped the fish with his hand, than he felt a kind of pricking sensation, which extended along the arm as far as the shoulder; this was succeeded by a fit of trembling and a sharp and oppressive pain in the elbow, to such an extent as to cause him instantly to drop the fish. Every time he touched it the same sensations were felt, but in a less and less degree as the animal became weaker; at the end of three hours, the

fish died, and its power of benumbing the hand was lost at the same instant.

But according to the same author, the Torpedo can at times be handled with impunity, even when not enfeebled by exertion or at the point of death; from this it would seem that this power was exerted or not, at the will of the animal. The stunning property of the Torpedo being considered as a species of electricity, the following experiments were made to ascertain that fact.

A living Torpedo was placed in a wet plate, two brass wires were suspended from the ceiling of the room by means of silk threads, for the purpose of isolating them; eight persons were arranged round the Torpedo, standing on stools with glass legs. Every thing being thus prepared, one end of one of the brass wires was placed in contact with the wet plate, which contained the animal, and the other was plunged in a basin full of water: one of the persons present dipped a finger of one hand in this basin, and the finger of the other hand in a second basin also full of water. The second person in like manner placed the finger of one hand in the second basin, and the finger of the other hand in a third basin; and in this manner, the eight persons present communicated with each other by means of water contained in nine basins. The experimenter then plunged one end of the second brass wire in the ninth basin, and with the other end, he touched the back of the Torpedo. He thus instantly formed an uninterrupted conductor many feet in circumference; from the under-part of the animal to the wet plate, thence to the first brass wire, the first basin, the eight observers, the second brass wire, and the back of the Torpedo.

The animated portions of this circle, that is, the eight

individuals who had the courage to place their fingers in the water in the basins, experienced a sudden shock, which only differed from that of an electrical machine by being less powerful, while Dr. Walsh, who conducted the experiment, but formed no part of the conducting chain, felt no shock, although he was nearer the centre of danger than the eight other individuals. The Torpedo gave as many as from forty to fifty shocks in the space of ninety seconds; these shocks were equal in power, and each was accompanied with an effort on the part of the fish, accompanied by a marked depression of the eyes, which, at other times were very prominent, but were now sunk in their orbits.

Further experiments proved, that all substances which were good conductors of electricity, readily transmitted the shock from the Torpedo, while the animal might be touched with impunity by non-conductors, such, for instance, as glass or sealing-wax.

The organ by which the shock is given is thus described by Cuvier. "The space between the pectoral fins, the head and the gills, is occupied on each side by an extraordinary apparatus, formed of little membranous tubes placed close to each other like a honeycomb, and subdivided horizontally into minute cells abundantly supplied with nerves. It is in this apparatus, that the electrical or galvanic power resides, which has rendered these fish so famous, and from which their name is derived; with it they can inflict violent shocks, and they most probably employ it to deprive their prey of power."

THE RAY TRIBE.

THESE fish very strongly resemble the Sharks in their anatomical structure ; like them they are cartilaginous fish, and have generally five gill openings on each side ; but they differ from the last tribe in the flat form of their body. "It is in the immensity of the seas, far from the coasts, that the Rays take up their abode during the greater part of the year ; there they attract the attention of the seaman by the vast space which their body covers, when they swim along the surface of the water in calm weather. They have been compared to the Eagle, which they resemble to a certain extent, by the large size of their wings (*fins*), the rapidity with which they swim, and the number of their victims. In the season of producing their young, they approach the coasts, and it is then they are taken in the greatest quantities."

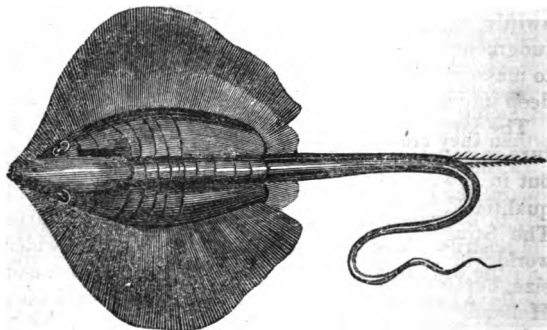
In the greatest part of this tribe the body is nearly square, the head being placed at one of the angles, and only to be known from the rest of the body by the eyes and nostrils. The pectoral fins, each of which is wider than the body itself, are of a triangular form. Some of the Rays have the upper part of the body covered with crooked spines, each arising from a small bony knob fixed in the skin. The tail is long and slender, and sometimes nearly square, decreasing in thickness as it approaches the end. The females of the Ray tribe are always larger than the males.

All the Rays when taken out of the water have a very disagreeable smell, which they lose by degrees after they are exposed to the air. So that, unlike other fish, they improve by keeping.

THE STING-RAY, (*Raia pastinaca*.)

Of all the ills that art or nature steals,
That seas produce, or earth's dark womb conceals,
None equal that the Raylike fire-flaire bears ;
No dreaded stroke, no killing wound like hers.
All things must yield ; the dire infection's such,
The solid flint would moulder at the touch.

It would be almost an endless task to enumerate all the animals to whom dangerous and fatal properties have been attributed by the ignorant, and even now, though



THE STING-RAY.

experiment after experiment has been made, proving the falsehood of the greater part of these assertions, many exist who, fond of the marvellous, and unwilling to relinquish old prejudices, still believe in all these wonderful tales. The lines quoted above, will give an idea of some of the imaginary fatal properties of the large species of Ray represented in the engraving. We

also quote from an old author, a prose description of the same fish, in which its dangerous qualities are equally exaggerated.

"The inhabitants of the sea that are large enough to devour men are very many, but those which have a power of hurting otherwise, more than by the absolute wound of their bite, are very few. In the first place, among these, however, is to stand, the Fierceflair or Fire-flaire, as it is commonly called.

"The tail is the creature's weapon of defence, but it is a mischievous fish, and will use it offensively. The method in which it does this, is by drawing the tail swiftly round the person's leg or body, as a man of judgment would draw the long lash of a hunting-whip to make it cut; and it thus strikes the end of the bone deep into the flesh."

The large notched bone beneath the tail of this creature is capable, no doubt, of inflicting a severe wound; but in this consists all the danger, and the poisonous qualities supposed to belong to it are merely imaginary. The Sting-Ray is found in almost every part of the world; in the European seas it seldom attains a large size, but in some parts of the world, particularly New Holland, it is found weighing as much as four hundred weight.

Some of the uncivilized inhabitants of America use the notched bone of this fish instead of a saw. In Japan, although the venomous properties of this bone are still considered real, yet with strange inconsistency it is employed as a remedy against the bite of Serpents.

THE LAMPREY TRIBE.

THE Lampreys, as far as regards their skeleton, are the most imperfect of all vertebral animals; they have neither pectoral nor ventral fins, the skeleton itself is without ribs, the only hard parts about them consisting of a kind of frame-work containing the gills, with which water communicates by seven small round openings on each side the head.



THE LAMPREY.

THE LAMPREY, (*Petromyzon marinus*,)

Is about two or three feet in length, and inhabits the sea, but in the spring approaches the fresh water. The mouth of the Lamprey is in a circular form, and it is in the habit of fixing itself by suction to stones and other solid bodies. These fish are found in the spring at the entrance of most large rivers, but more particularly those of England, France, and Germany. The time when they deposit their spawn, which is at this time of the year, is generally chosen for the fishing of Lampreys. In the capture of these fish, weirs made of wicker-work are in general employed, into which they can enter without being able to make good their retreat. At the entrance of certain rivers in France, particularly the Loire, about the time of Christmas, they construct banks or dams of wood and stone, to which they give the name of *duits*, and on which from forty to sixty weirs are laid, about six

feet in length, and touching each other; these are visited about once a day, and the fish that have entered the trap taken out, by raising a small door at one end of the weir, or by removing a plug of hay or straw. The weirs are allowed to remain in this way for three or four months.

In other places, a kind of net called a *louve* or a *loup*, in which the meshes are about an inch square, is employed, the centre of the net forming a sort of pocket.

The Lamprey was in high repute in Rome in ancient times, and even much later, according to the account of an Italian poet, named Paulo Giovio, who wrote on fish, about the year 1524; and who states, that he has seen them sold for as much as ten pieces of gold each, this is confirmed by another writer of the same time: who accused the Popes and the nobility of the Roman capital of luxury, for regaling their friends with Lampreys, which they had purchased at the rate of five, six, eight, and even twenty pieces of gold each; these were served up in a dish with Cyprus wine, with a nutmeg in the mouth, and a clove in each of the gill openings, with peeled almonds and spices of all sorts.

At Christmas, when these fish are scarce, the town of Gloucester presents a Lamprey pie to the king, according to ancient custom.

Many physicians, in spite of the favour in which Lampreys are held, have denounced them as an unwholesome or even poisonous food; and the death of Henry the First is said to have arisen from having eaten too heartily of a mess of these fish.

The power possessed by the Lamprey, of adhering to a stone by means of its mouth, is so great, that a fish of

three pounds is able to support a stone of twelve pounds weight, the fish itself being held by the tail.

THE LAMPERN, (*Petromyzon fluviatilis.*)

THE Lampern is a small fish, seldom exceeding fourteen inches in length. When preparing to spawn, this fish forms holes in the bottom of the river, for the purpose of depositing its ova, and on this occasion the sucking power of the mouth is of great service, for by enabling it to attach itself to a stone, it retains a fixed position during the operation.

THE ART OF ANGLING.

Away to the brook
 All your tackle outlook
 Here's a day that is worth a year's wishing,
 See that all things be right,
 For 'twould be a spite,
 To want tools when a man goes a fishing.
 A basket neat made,
 By a master in 's trade,
 In a belt at your shoulders must dangle,
 For none e'er was so vain,
 To wear this to disdain,
 Who a true brother was of the angle.
 Next pouch must not fail,
 Stuffed as full as a mail,
 With wax, crewels, silk, hair, fur and feathers,
 To make several flies,
 For the several skies,
 That shall kill in despite of all weathers.—CORRON.

HAVING, in the course of this little work, given an account of the different modes of taking fish in great quantities with nets, and by other means, we shall devote a few pages to a consideration of the means employed to capture these inhabitants of the waters with hook and line, by the exercise of skill and dexterity, or, as the practice is familiarly termed, by the Art of Angling.

In defence of angling from some objections which have been made to it, Sir Humphry Davy has well observed that, if fish are to be eaten, there is no more

harm in capturing them by skill and ingenuity with an artificial fly, than by pulling them out of the water by main force with the net. In general, when taken by the common fishermen, fish are permitted to die slowly, and to suffer in the air from the want of their natural element ; whereas every good angler, as soon as his fish is landed, either destroys his life immediately, if he is wanted for food, or returns him into the water.

The search after food, continues Sir Humphry Davy, is an instinct belonging to our nature ; and, from the savage in his rudest and most primitive state, who destroys a piece of game or a fish with club or spear, to man in the most cultivated state of society, who employs artifice, machinery, and the resources of various other animals, to secure his object, the origin of the pleasure is similar, and its object the same. That kind of it, however, which requires most art, may be said to characterize man in his highest or intellectual state ; and he who fishes for Salmon and Trout with the fly, employs not only machinery to assist his physical powers, but applies sagacity to conquer difficulties ; the pleasure derived from ingenious resources and devices, as well as from active pursuit, belongs to this amusement. Then as to its philosophical tendency, it is a pursuit of moral discipline, requiring patience, forbearance, and command of temper. As connected with natural science, it may be vaunted as demanding a knowledge of the habits of a considerable tribe of created beings—fishes and the animals they prey upon—and an acquaintance with the signs and tokens of the weather and its changes, and of the nature of waters and of the atmosphere.

As to its poetical relations, it carries us into the most wild and beautiful scenery of nature ; amongst the

mountain lakes, and the clear and lovely streams that gush from the higher ranges of elevated hills. How delightful in the early spring, after the dull and tedious time of winter, when the frosts disappear and the sunshine warms the earth and waters, to wander forth by some clear stream, to see the leaf bursting from the purple bud, to scent the odours of the bank perfumed by the violet, and enamelled, as it were, with the primrose and the daisy. To wander upon the fresh turf below the shade of trees, whose bright blossoms are filled with the music of the bee, and on the surface of the waters to view the gaudy flies sparkling like animated gems in the sunbeams, whilst the bright and beautiful Trout is watching for them below ; to hear the twittering of the water-birds, who, alarmed at your approach, rapidly hide themselves beneath the flowers and leaves of the water-lily ; and, as the season advances, to find all these objects changed for others of the same kind, but better and brighter, till the Swallow and the Trout contend as it were for the gaudy May-fly, and till, in pursuing your amusement in the calm and balmy evening, you are serenaded by the songs of the cheerful Thrush and melodious Nightingale, performing the offices of paternal love, in thickets ornamented with the rose and woodbine.

The practice of the art of angling is chiefly confined to the capture of fish in rivers and lakes.

One necessary qualification of an Angler is patience. A lover of angling was fishing in the river Lea, at a ferry called Jeremy's, and had hooked a large fish at the time when some Londoners with their horses were passing ; they congratulated him on his success, and got out of the ferry-boat, but finding the fish not likely to

yield, mounted their horses and rode off. The fact was that angling for small fish, his bait had been taken by a Barbel too big for the fisher to manage. Not caring to risk his tackle by attempting to raise him, he hoped to tire him, and to that end suffered himself to be led (to use his own expression) as a blind man is by his dog, several yards up and as many down the bank of the river; in short for so many hours that the horsemen above-mentioned (who had been at Walthamstow and dined,) were returned; who seeing him thus occupied, cried out—What, master! another large fish? No, says Piscator, it is the very same. Nay, says one of them, that can never be, for it's five hours since we crossed the river: and not believing him they rode on their way. At length our angler determined to do that, which a less patient one would have done long before: he made one vigorous effort to land his fish, broke his tackle, and lost him.

The principal methods employed in angling are fly-fishing, float-fishing, and trolling. Fly-fishing is considered as the most interesting, and certainly requires greater skill and manual dexterity than either of the others. In fishing with the artificial fly, says old IZAAK WALTON, the great authority upon all these matters, you are to angle with a line longer by a yard and a half, or sometimes two yards, than your rod.

For the length of your rod, you are always to be governed by the breadth of the river you shall choose to angle in. For a Trout river, one of five or six yards long is commonly enough; and longer (though never so neatly and artificially made) it ought not to be, if you intend to fish at ease: and if otherwise, where lies the sport?

When your tackle is prepared, let out the line, about

half as long again as the rod ; and holding the rod properly in one hand, and the line, just above the fly, in the other, give your rod a motion from right to left : and as you move the rod backwards, in order to throw out the line, dismiss the line from your hand at the same time : and try several throws at this length. Then let out more line, and try that ; still using more and more, till you can manage any length needful ; but about nine yards is quite sufficient for a learner to practise with. Observe, that in raising your line, in order to throw it again, you should wave the rod a little round your head, and not bring it directly backwards : nor must you return the line too soon, nor till it has streamed its full length behind you, or you will certainly whip off your end fly.

There is great art in making your line fall light on the water, and showing the flies well to the fish. The best way that I can direct is, that, when you have thrown out your line, contriving to let it fall lightly and naturally, you should raise your rod gently, and by degrees, sometimes with a kind of gentle tremulant flourish, which will bring the flies on a little towards you, still letting them go down with the stream, but never draw them against it, for it is unnatural ; and before the line comes too near you, throw out again.

When you see a fish rise at a natural fly, throw about a yard above him, but not directly over his head ; and let your fly (or flies) move gently towards him, which will show the bait in a more natural form, and tempt him the more to take it. Experience and observation alone, however, can make an angler a complete adept in the art, so as to enable him to throw his fly behind bushes and trees, into holes, under banks, and other places mentioned as the Trout's haunts, and where the best fish are to be found.

The artificial fly can be purchased at the tackle-shops; but every expert angler is expected to be able to form his own; for this purpose he must have a variety of materials, the following list of which is given in a note in *WALTON'S Angler*.

First, you must be provided with bear's hair of divers colours, as gray, dun, light and dark coloured, bright brown and that which shines; also camel's hair, dark, light, and of a colour between both; badger's hair, or fur; spaniel's hair from behind the ear, light and dark brown, blackish and black; hog's down, which may be had about Christmas of butchers, or rather of those that make brawn; it should be plucked from under the throat, and other soft places of the hog, and must be of the following colours, namely, black, red, whitish, and sandy; and for other colours, you may get them dyed at a dyer's: seal's fur is to be had at the trunk-maker's; get this also dyed of the colours of cow's and calf's hair, in all the different shades, from the light to the darkest brown; you will then never need cow's or calf's hair, both which are harsh, and will never work kindly, nor lie handsomely: get also mohairs, black, blue, purple, white, violet. Philomot, from *feuille mort*, a dead leaf, yellow and orange; camlets, both hair and worsted, blue, yellow, dun, light and dark brown, red, violet, purple, black, horse-flesh, pink, and orange colours. Some recommend the hair of young colts and calves; but seals' fur, dyed as above, is much better.

A piece of an old Turkey carpet will furnish excellent dubbing: untwist the yarn, and pick out the wool, carefully separating the different colours, and lay it by.

Some use for dubbing, barge-sail, concerning which the reader is to know, that the sails of west-country and

other barges, when old, are usually converted into tilts, under which there is almost a continual smoke arising from the fire and the steam of the beef-kettle, which all such barges carry, and which in time dyes the tilt of a fine brown; this would be excellent dubbing, but that the materials of these sails is sheep's wool, which soaks in the water, and soon becomes very heavy: however, get of this as many different shades as you can, and have seal's fur and hog-wool dyed to match them; which, by reason they are more turgid, stiff, and light, and so float better, are, in most cases, to be preferred to worsted, crewels, and, indeed, to every other kind of wool; and observe, that the hog-wool is best for large, and the seal's fur for small flies.

Get also furs of the following animals, namely, the squirrel, particularly from its tail; fox-cub, from the tail where it is downy, and of an ash colour; an old fox; an old otter; otter cub; badger; a hare, from the neck, where it is of the colour of withered fern; and above all, the yellow fur of the marten, from off the gills or spots under the jaws. All these, and almost every other kind of fur, are easily got at the furrier's.

Hackles are a very important article in fly-making; they are the long slender feathers that hang from the head of a cock down his neck; there may also be fine ones got from near his tail; be careful that they are not too rank, which they are when the fibres are more than half an inch long, and for some purposes these are much too big; be provided with these of the following colours, namely, red, dun, yellowish, white, orange, and perfect black; and whenever you meet, alive or dead, with the cock of the game breed, whose hackle is of a strong

brown-red, never fail to buy him : but observe, that the feathers of a cock chicken, be they ever so fine for shape and colour, are good for little, for they are too downy and weak to stand erect after they are once wet, and so are those of the bantam cock.

Feathers are absolutely necessary for the wings and other parts of flies : get therefore feathers from the back and other parts of the wild mallard, or drake ; the feathers of a partridge, especially those red ones that are in the tail ; feathers from a cock pheasant's breast and tail ; the wings of a blackbird, a brown hen, of a starling, a jay, a land-rail, a thristle, a fieldfare, and a water-coot ; the feathers from the crown of the pewit, plover, or lapwing ; green and copper-coloured peacock's, and black ostrich ; feathers from a heron's neck and wings. And remember that, in most instances, where the drake's or wild mallard's feather is directed, that from a starling's wing will do much better, as being of a finer grain, and less spongy.

Be provided with marking-silk of all colours ; fine, but very strong, flax-silk ; gold and silver flatted wire, or twist ; a sharp knife ; hooks of all sizes ; hog's bristles for loops to your flies ; shoemaker's wax ; a large needle to raise your dubbing, when flatted with working ; and a small, but sharp pair of scissars.

And lastly, if any materials required may have been omitted in the foregoing catalogue, be careful to add them to your former stock, as often as you shall find any such omissions.

Remember, with all your dubbing, to mix bear's hair and hog's wool, which are stiff, and not apt to imbibe the water, as the fine furs and most other kind of

dubbing do; and remember also, that marten's fur is the best yellow you can use."

For float-fishing let the rod be light and stiff, and withal so smart in the spring, as to strike at the tip of the whalebone. From fourteen to fifteen feet is a good length.

In places where you sometimes meet with Barbel, as at Shepperton and Hampton in Middlesex, the fittest line is one of six or seven hairs at top, and so diminishing for two yards; let the rest be strong Indian grass, to within about half a yard of the hook, which may be whipped to a fine grass of silk-worm gut. And this line will kill a fish of six pounds weight.

But for mere Roach and Dace fishing, accustom yourself to a single hair line, with which an artist may kill a fish of a pound and half weight.

For your float. In slow streams a neat round goose quill is proper; but for deep or rapid rivers, or in an eddy, the cork shaped like a pear, is indisputably the best, which should not in general exceed the size of a nutmeg; let not the quill which you put through it be more than half an inch above and below the cork: and this float, though some prefer a swan's quill, has great advantage over a bare quill, for the quill being defended from the water by the cork, does not soften; and the cork enables you to lead your line so heavily, as that the hook sinks almost as soon as you put it into the water; whereas, when you lead but lightly, it does not go to the bottom till it is near the end of your swim. And in leading your lines, be careful to balance them so nicely, that a very small touch will sink them: some use for this purpose lead shaped like a barley-corn; but there

is nothing better to lead with than shot, which you must have ready cleft always with you; remembering, that when you fish fine, it is better to have on your line a great number of small, than a few large shot.

Whip the end of the quill round the plug with fine silk well waxed; this will keep the water out of your float, and preserve it greatly.

In fishing with a float, your line must be about a foot shorter than your rod; for, if it is longer, you cannot so well command your hook when you come to disengage your fish.

Perch and Chub are caught with a float, and also Gudgeons; and sometimes Barbel and Grayling.

For Carp and Tench, which are seldom caught but in ponds, use a very small goose or a duck-quill float: and for ground bait throw in, every now and then, a bit of chewed bread.

For Barbel, the place should be baited the night before you fish, with graves, which are the sediment of melted tallow, and may be had at the tallow-chandler's. Use the same ground-bait while you are fishing, as for Roach and Dace.

In fishing with a float for Chub, in warm weather, fish at mid-water; in cool, lower; and in cold, at the ground.

Trolling is one of the means employed in the taking of Pike. The rod for trolling should be about three yards and a half long, with a ring at the top for the line to run through; or you may fit a trolling-top to your fly-rod, which need only be stronger than the common fly-top.

Let your line be of green or sky-coloured silk, thirty

yards in length, which will make it necessary to use the winch, with a swivel at the end of the line.

The common trolling-hook consists of two hooks fastened together, and loaded sufficiently to sink the bait, which is a dead fish, a gudgeon is the best; this bait, after the fins are cut off, is as it were spitted on the hooks, in such a manner as to allow the barbs of the two hooks to come out one on each side of the mouth of the bait. Within two feet of the hook a swivel is placed, the use of this is to cause the bait, when the line is drawn quickly through the water, to move with considerable rapidity, in a serpentine, or rather circular motion, so as to imitate the natural movement of a living fish, at the same time to attract the Pike by the glistening appearance which this motion produces. When the Pike is taking the bait he swims or *runs* directly to his hole, but he has not *gorged*, swallowed, the bait, but has merely secured it by grasping it by the middle, the angler therefore must not as yet expect that his prize is safe, but must allow the Pike quietly to reach his hole; here it swallows the bait, and no sooner does it feel that the hooks have held fast than it makes a second *run* to endeavour to escape, and now it is that the angler requires all his skill and patience to land his formidable prey.

The following humorous **MAXIMS** and **HINTS** for an **ANGLER**, by a gentleman well known for his love of, and proficiency in, the sport, are given in *Jesse's Gleanings of Natural History*.

Are there any fish in the river to which you are going?

Having settled the above question in the affirmative, get some person who knows the water to show you whereabouts the fish usually lie ; and when he shows them to you, do not show yourself to them.

Comparatively coarse fishing will succeed better when you are not seen by the fish, than the finest when they see you.

Do not imagine that, because a fish does not instantly dart off on first seeing you, he is the less aware of your presence : he almost always on such occasions ceases to feed, and pays you the compliment of devoting his whole attention to you, whilst he is preparing for a start whenever the apprehended danger becomes sufficiently imminent.

When you are fishing with the natural May-fly, it is as well to wait for a passing cloud, as to drive away the fish by putting your fly to him in the glare of the sunshine, when he will not take it.

If you pass your fly neatly and well three times over a trout, and he refuses it, do not wait any longer for him : you may be sure that he has seen the line of invitation which you have sent over the water to him, and does not intend to come.

If your line be nearly *taught*, as it ought to be, with little or no gut in the water, a good fish will always hook himself, on your gently raising the top of the rod when he has taken the fly.

If, after hooking a trout, you allow him to remain stationary but for a moment, he will have time to put his helm hard a-port or a-starboard, and to offer some resistance. Strong tackle now becomes useful.

Bear always in mind that no tackle is strong enough,

unless well handled. A good fisherman will easily kill a trout of three pounds with a rod and line which are not strong enough to lift a dead weight of one pound from the floor, and place it on the table.

Remember that, in whipping with the artificial-fly, it must have time, when you have drawn it out of the water, to make the whole circuit, and to be at one time straight behind you, before it can be driven out straight before you. If you give it the forward impulse too soon, you will hear a crack. Take this as a hint that your fly is gone to grass.

If your line should fall loose and wavy into the water, it will either frighten away the fish, or he will take the fly into his mouth without fastening himself; and when he finds that it does not answer his purpose, he will spit it out again before it has answered yours.

When, during the season of the May-fly, your friends, the gentlemen from London, say that they 'have scarcely seen a fish rise all day,' do not too hastily conclude that the fish have not been feeding on the fly.

The only 'rising' which is seen by the unlearned is the splash which is made by a fish when he darts from a considerable depth in the water to catch an occasional fly on the surface. There is, however, another sort of 'rising,' which is better worth the skilful angler's attention.

If your fly (gut unfortunately included) should swim over a fish without his taking it, look out well for a darting line of undulation, which betokens his immediate departure; and remember, that it is of no use to continue fishing for him after he is gone.

WE have already noticed that it is unnecessary to employ live bait for the purpose of taking fresh-water fish ; and, as a guide to the young Angler, the following list has been arranged of the names of the principal species, the places they haunt, the season for fishing, the best time of day for capturing them, the depth at which they are found, and the description of paste or artificial fly which forms the best bait.

BREAM. In rough streams in rivers and the middle of ponds ; from April to Michaelmas, from sunrise to nine o'clock, and three to sunset ; close to ground.—*Bait*, new bread, made into little pellets, and coloured with vermilion.

BARBEL. Gravel banks in currents under bridges ; from April to August ; very early in the morning or late in the evening ; close to ground.—*Bait*, graves.

BLEAK. Sandy bottoms, in deep rivers ; from May to October ; all day ; six inches from ground.—*Bait*, new bread, as for Bream, or small artificial fly.

CARP. Still deep mud bottom, ponds or river ; from May to August ; morning and evening ; three inches from bottom ; mid-water in hot weather.—*Bait*, paste made of flour and water ; a little cotton wadding to give it consistency, and brightly coloured.

CHUBB. Same places, and at same depth, as Carp ; May to December ; morning and evening.—*Bait*, same as Bream, or with gaudy artificial fly.

DACE and ROACH. Sandy bottoms, deep rivers, and ships' sterns ; May to October ; all day ; six to twelve inches from bottom.—*Bait*, as for Bream, or small fly.

GRAYLING. Clay bottom, swift streams ; all the year ; all day ; in cold weather, near bottom ; in hot, about mid-water.—*Bait*, artificial fly.

PERCH. In rivers and ponds ; May to August ; morning and evening ; six inches from bottom.—*Bait*, artificial minnow.

PIKE. Near clay banks ; all the year ; all day ; mid-water.—*Bait*, artificial fish, frog, or mouse.

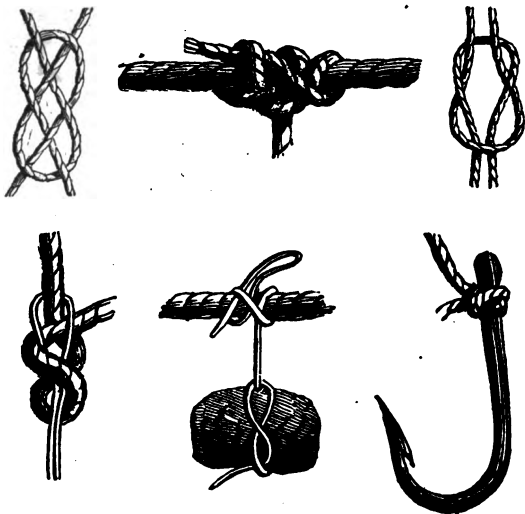
SALMON. Deep rivers ; March to September ; morning and afternoon ; mid-water.—*Bait*, artificial flies.

TROUT. Brisk streams, and eddies of rivers ; March to September ; all day ; in cold weather, near bottom ; in hot, top to mid-water.—*Bait*, artificial flies ; or, in muddy water, with artificial spinning-minnow.

TENCH. Mud bottoms, in rivers and ponds ; all the year ; all the day ; in hot weather, top to mid-water ; in cold, near bottom.—*Bait*, same as for Bream.

KNOTS FOR ANGLERS.

THE following figures, showing the method of making the knots most in use among fishermen and anglers, will be found serviceable to the beginner.



THE END.

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